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**ONR ltr, 15 Nov 1962; ONR ltr, 25 Jun 1971**

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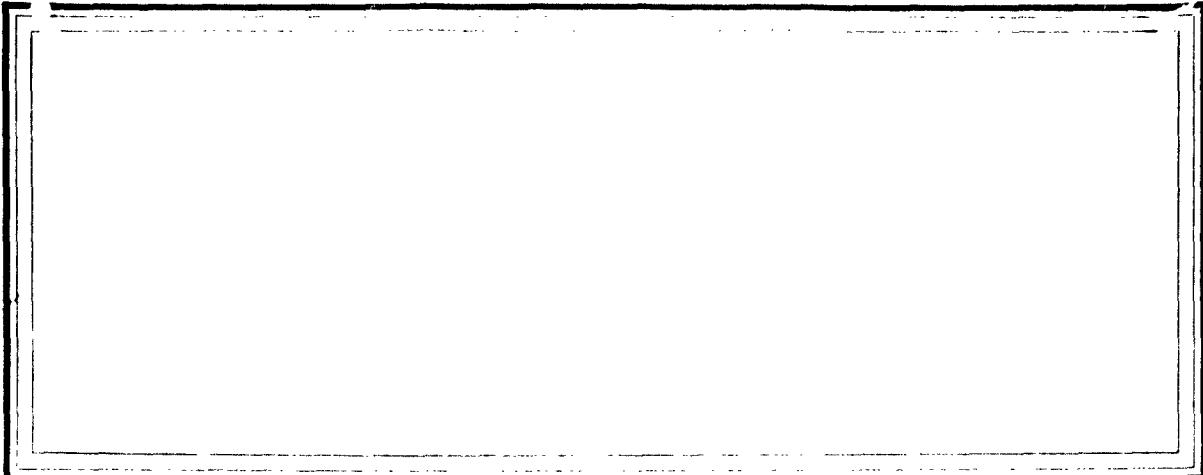
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# ELECTRONICS PERSONNEL RESEARCH

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DEPARTMENT OF PSYCHOLOGY  
UNIVERSITY OF SOUTHERN CALIFORNIA

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DATA SUPPLEMENT

to accompany

Technical Report No. 2

SHIPBOARD OBSERVATION OF ELECTRONICS PERSONNEL:  
DETAILED DESCRIPTIONS OF OBSERVATIONAL TECHNIQUES.

Project Designation NR 153-093

Contract Nonr-228(02)

Principal Investigator

William W. Grings

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the national defense of the United States  
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DEPARTMENT OF PSYCHOLOGY  
UNIVERSITY OF SOUTHERN CALIFORNIA

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## INTRODUCTION

This supplement has been prepared to accompany Report No. 2 of this series, which is entitled "Shipboard Observation of Electronics Personnel: Detailed Descriptions of Observational Techniques." The supplement consists of a complete set of data collected by the use of the techniques referred to in that report. These data are provided to those within the Navy structure who are working within the general area of electronics personnel research. No attempt is made to interpret the information at this point. Such interpretations as will be forthcoming will be presented in the subsequent reports of this series.

These data are made available after considerable hesitation on the part of the investigators, for it is recognized that such material is frequently subject to misinterpretation. On the other hand, such a presentation has a number of advantages: 1) It makes all of the information available to the sponsors of the research. 2) Many practical service problems may be illuminated by an examination of this material. 3) The reader may interpret the facts for himself.

Since the advantages appear to outweigh the disadvantages, the information is presented with the hope that it will not mislead anyone. The reader is reminded of the exploratory nature of the investigation and is urged to exercise a great deal of caution in any attempt to generalize from this material.

These data will be related to a number of training and operational problems in subsequent reports. This presentation should not be considered as the end-product of the research.

The supplement is not designed to stand alone. A detailed description of the various observational techniques are presented in the body of the report and the forms are included in the appendices.

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The symbols and many of the abbreviations used in the tables are given below together with their meanings. Any changes in the meaning of the symbols from that given below are noted in the text accompanying the tables.

N . . . . . Total number of individuals in a particular group.  
n . . . . . Number of individuals in a specified subgroup.  
f or Freq. . . Frequency or number of individuals giving a specific response.  
NR or No Resp. . No response - in general, number of no responses in a group.  
Desig. . . . . Designation - refers to titles of groups listed.

M . . . . . Mean or average value.  
Mdn . . . . . Median - point where half the response values lie below it and half of the response values lie above.  
Q . . . . . Semi-interquartile range value used as a measure of the dispersion of response values.  
Rk. . . . . Ranks or order positions of the values.

C . . . . . Chief  
1 . . . . . 1st Class  
2 . . . . . 2nd Class  
3 . . . . . 3rd Class  
SN. . . . . Seaman

ET. . . . . Electronics Technicians  
SO. . . . . Sonarmen  
RD. . . . . Radarmen  
RM. . . . . Radiomen  
FC. . . . . Fire Controlmen

EMO . . . . . Electronics materiel officers  
CIC . . . . . Combat information center officers  
GUN . . . . . Gunnery officers  
ASW . . . . . Anti-submarine warfare officers  
COM. . . . . Communications officers  
EXEC. . . . . Executive officers

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Job Questionnaire Item No. 1 (name), not tabulated.

Job Questionnaire Item No. 2 (rank/rate), not tabulated. See Job Questionnaire Item No. 9, Table 6.

Table 1

Median Length of Time in Months Present Rank or Rate Has Been Held  
(Job Questionnaire - Item No. 3)

Designation	Total	n	C	n	1	n	2	n	3	n	SN	No Resp.
	N	Mdn	n	Mdn	n	Mdn	n	Mdn	n	Mdn	Mdn	
ET	82	9	6	8	7	12	8	10	32	9	29	8
SQ	116	7	3	12	8	14	23	4	32	8	50	8
RD	202	7	3	12	4	4	30	5	58	6	107	7
RM	112	7	3	82	4	17	10	26	26	3	69	7
FC	18	23	4	82	5	32	3	58	5	1	1	10
EMO	13	14	--	--	--	--	--	--	--	--	--	1

Job Questionnaire Item No. 4's results are not presented in tabular form. The question asked for the highest rank/rate held. The purpose of the question was to determine how many men had held a rank/rate higher than their present one. The responses indicate that most men are currently holding their highest rank/rate with the following exceptions:

- One ET/SN had been a USNR Midshipman.
- One SO/3 had been a SO/2.
- Two RD/SN had been RD/3.
- One RD/2 had been a RD/1.
- Two RD/3 had been RD/2.
- Three RD/SN had been RD/3.
- One RD/SN had been a USNR Midshipman.

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Table 2  
Mean Ages in Years of the Indicated Groups  
(Job Questionnaire - Item No. 5)

Designation	Total		C		1		2		3		SN		No Resp.
	N	M	n	M	n	M	n	M	n	M	n	M	
ET	82	22	6	31	7	23	8	22	31	22	29	21	1
SO	116	22	3	32	8	26	23	22	32	22	49	20	1
RD	202	21	3	28	4	27	30	22	58	22	106	21	1
RM	112	22	3	33	4	27	10	26	26	22	68	21	1
FC	18	28	4	34	5	30	3	28	5	21	1	22	0
EMO	13	27	--	--	--	--	--	--	--	--	--	--	1

Table 3  
Median Lengths of Time in Months Indicated Groups Have Been on Their Present Ships  
(Job Questionnaire - Item No. 6)

Designation	Total		C		1		2		3		SN		No Resp.
	N	Mdn	n	Mdn	n	Mdn	n	Mdn	n	Mdn	n	Mdn	
ET	82	9	6	16	7	29	8	4	31	16	28	6	2
SO	116	10	3	20	8	14	23	23	32	10	50	6	—
RD	202	14	3	14	4	42	30	26	58	20	107	9	3
RM	112	10	3	10	4	6	10	16	26	14	68	9	1
FC	18	16	4	5	5	23	3	20	5	17	1	14	—
EMO	13	8	--	--	--	--	--	--	--	--	--	--	1

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Table 4

Median Lengths of Time in Months of Service in the Navy  
(Job Questionnaire - Item No. 7)

Designation	Total		C		1		2		3		SN		No Resp.
	N	Mdn	n	Mdn	n	Mdn	n	Mdn	n	Mdn	n	Mdn	
ET	82	35	6	144	7	54	8	45	31	35	28	18	2
SO	116	24	3	126	8	90	23	45	32	28	50	16	0
RD	202	23	3	136	4	72	30	45	58	36	106	17	1
RM	112	22	3	147	4	78	10	54	26	42	68	17	1
FC	18	72	4	144	5	114	3	66	5	33	1	46	0
EMO	13	48	--	--	--	--	--	--	--	--	--	--	1

Table 5

Percentages of Indicated Groups That are USN and USNR  
(Job Questionnaire - Item No. 8)

Designation	Total			C			1			2			3			SN		
	N	%	%	n	%	%	n	%	%	n	%	%	n	%	%	n	%	%
ET	82	96	4	6	100	0	6	83	17	8	100	0	30	97	3	27	96	4
SO	113	93	7	3	100	0	8	100	0	23	87	13	29	93	7	50	94	6
RD	202	91	9	3	100	0	3	100	0	29	93	7	56	86	14	98	93	7
RM	112	78	22	3	100	0	4	50	50	10	60	40	26	69	31	68	85	15
JO	18	78	22	4	75	25	5	80	20	3	67	33	5	100	0	1	0	100
EMO	13	50	50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1

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Table 6  
Composition of the Sample  
(Job Questionnaire - Item No. 9)

	C	1	2	3	SN	Total
ET	6	7	8	32	29	82
SO	3	8	23	32	50	116
RD	3	4	30	58	107	202
RM	3	4	10	26	69	112
FC	4	5	3	5	1	18
EMO	--	--	--	--	--	13

Table 7  
Median Lengths of Time in Months Indicated Rates Have Held Present Job Title  
(Job Questionnaire - Item No. 10)

Designation	Total		C		1		2		3		SN		No Resp.
	N	Mdn	n	Mdn	n	Mdn	n	Mdn	n	Mdn	n	Mdn	
ET	82	21	6	14	7	48	7	35	30	23	27	16	5
SO	116	12	3	23	8	52	21	32	31	19	49	7	4
RD	202	12	3	17	4	34	27	36	54	27	102	8	12
RM	112	12	3	82	4	42	10	35	25	26	69	8	4
FC	18	36	4	84	5	78	3	16	5	17	1	40	--
EMO	13	11	--	--	--	--	--	--	--	--	--	--	2

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Table 8

Frequencies of Listing of Previous Job Titles\*  
(Job Questionnaire - Item No. 11)

Categories of Job Titles	ET N = 82**	SO N = 116	RD N = 202	RM N = 112	FC N = 18
Electronics	8	0	2	2	0
Sonarmen	0	13	1	0	0
Radarmen	0	1	37	0	0
Communications	2	0	8	31	0
Fireman	2	3	3	1	0
Yeoman	1	1	0	2	0
Midshipman	1	0	0	2	0
Seaman	9	47	67	33	7
Quartermaster	0	1	1	4	0
Students	0	5	2	0	0
Instructors	0	2	0	0	0
Machine Operators	0	2	1	1	0
Supply	0	1	1	0	0
Ordinance	4	3	6	2	13
Administration	0	0	1	0	0
(Miscellaneous)	0	6	8	2	1
No Previous Job Titles	54	47	111	52	8
No Response	1	7	13	2	0

\* Job Titles were grouped in more general categories.

\*\* Since more than one previous job title could be listed by an individual, the N for the group may not correspond with the total number of responses for the group.

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Table 9

Frequencies of Listing of Service in Other Military Branches\*

(Job Questionnaire - Item No. 12)

Branch of Service	ET N = 82	SO N = 116	RD N = 202	RM N = 112	FC N = 18	EMO N = 13
Army Air Force	0	0	0	1	1	0
US Army	0	2	3	3	0	0
Marines	0	0	3	1	0	0
State Guard	1	3	7	4	0	0
Merchant Marine	1	0	0	2	0	0
ROTC	2	1	2	0	0	0
None	76	104	178	11	17	12
No Response	2	6	9	90	0	1

\* Only one individual indicated having an electronics job in another branch of service.

Table 10

Median Number School Years Completed for Indicated Groups

(Job Questionnaire - Item No. 13)

Designation	Total N	Total Mdn	n C Mdn	n 1 Mdn	n 2 Mdn	n 3 Mdn	n SN Mdn	No Resp.	
ET	82	12	6	12	7	12	31	12	2
SO	116	12	3	12	8	11	23	12	0
RD	202	12	3	12	4	12	30	12	1
RM	112	12	3	12	4	13	10	12	1
FC	18	12	4	12	5	12	3	12	0
EMO	13	16	--	--	--	--	--	--	1

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Table 11

Frequencies of Listing of Major School Subjects by Indicated Groups  
 (Job Questionnaire - Item No. 13a)

Major School Subjects	ET N = 82*	SO N = 116	RD N = 202	RM N = 112	FC N = 18	EMO N = 13
<b>High School Subjects</b>						
Mathematics	20	19	22	12	2	0
General Academic	20	48	52	35	8	0
Science	13	9	13	8	1	0
Chemistry	6	0	1	0	0	0
Industrial Arts	2	7	15	10	0	0
Physics	1	0	2	1	0	0
Forestry	1	0	0	0	0	0
Drafting	1	3	5	5	0	0
Pre-Engineering	1	0	0	2	0	0
Business	0	0	9	2	0	0
Printing	0	0	2	0	0	0
Agriculture	0	0	3	4	0	0
<b>College Subjects</b>						
Engineering	29	2	6	1	1	10
Architecture	2	1	2	0	0	0
Psychology	1	0	0	1	0	0
General Academic	0	5	16	6	1	0
Mathematics	0	1	2	1	0	0
Science	0	4	7	0	0	0
Business	0	4	3	6	1	1
Education	0	2	2	3	0	0
Agriculture	0	1	2	1	0	0
Forestry	0	0	2	0	0	0
Chemistry	0	0	1	0	1	0
Physics	0	0	0	0	0	1
Law	0	0	0	2	0	0
None	4	6	22	6	2	1
No Response	15	16	38	23	3	1

Since more than one major subject was listed by some respondents, and because both high school and college subjects were listed, the N for the group may not correspond with the total number of responses for the group.

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Table 12

Frequencies of Listing of Subjects Studied in Civilian Trade Schools  
(Job Questionnaire - Item No. 14)

Subjects Studied	ET N = 82*	SO N = 116	RD N = 202	RM N = 112	FC N = 18	EMO N = 13
Electronics	1	0	0	2	0	0
Radio	5	0	2	3	2	0
Electricity	3	3	1	0	0	0
Air Conditioning	1	0	0	0	0	0
Mechanical Arts	0	4	2	3	0	1
Drafting	0	1	2	0	0	0
Business Courses	0	1	2	3	0	0
Aviation Courses	0	2	0	0	0	0
Crafts	0	2	2	0	0	0
Railroad Telegraph	0	0	0	3	0	0
Agriculture	0	0	2	0	0	0
General Courses	3	2	3	2	0	1
None	65	94	145	89	15	10
No Response	4	10	16	7	1	1

\* Since more than one subject was listed by some individuals, the N for the group may not correspond with the total number of responses for the group.

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Table 15

Frequencies of Listing of Civilian Jobs Held Six Months or Longer  
(Job Questionnaire - Item No. 15)\*

Civilian Jobs	ET N = 82	SO N = 116	RD N = 202	RM N = 112	FC N = 18	EMO N = 13
General Clerical	33	0	0	0	0	0
General Industrial	13	7	7	3	3	3
Mechanical Trades	11	0	0	0	0	0
Farming	10	151	202	101	10	3
Salesman	5	0	0	0	0	0
Radio-Electrical	5	1	2	2	1	2
Engineering	3	0	0	0	0	0
Surveying	3	0	0	0	0	0
Wood Worker	4	0	0	0	0	0
Tradesman	4	0	0	0	0	0
Telephone Maintenance	2	0	0	0	0	0
Dental Technician	1	0	0	0	0	0
Student	1	0	0	0	0	0
None	21	22	34	23	6	4
No Response	2	3	6	7	0	1

\* Some respondents gave more than one response.

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Table 14

Frequencies of Listing By Groups of Types of Navy Schools Attended

(Job Questionnaire - Item No. 16)

Designation	School	C N = 6	1 N = 7	2 N = 8	3 N = 32	SN N = 29	Combined N = 82
ET*	Class A	6	7	8	29	24	74
	Class B	3	6	5	6	6	26
	Class C	3	1	7	7	2	20
	Fleet	2	6	0	1	2	11
	No Response	0	0	0	2	4	6

Designation	School	C N = 4	1 N = 5	2 N = 3	3 N = 5	SN N = 1	Combined N = 18
FC*	Class A	4	5	1	4	1	15
	Class B	3	2	1	0	0	6
	Class C	1	2	0	2	0	2
	Fleet	1	1	0	0	0	2
	No Response	0	0	2	0	0	2

Designation	School	C N = 3	1 N = 4	2 N = 30	3 N = 53	SN N = 107	Combined N = 202
RD**	Class A	2	3	27	48	59	139
	No Response	0	0	0	2	24	26

Designation	School	C N = 3	1 N = 8	2 N = 23	3 N = 32	SN N = 50	Combined N = 116
SO**	Class A	3	8	23	32	40	106
	No Response	0	0	0	0	0	9

Designation	School	C N = 3	1 N = 4	2 N = 10	3 N = 26	SN N = 69	Combined N = 112
RM**	Class A	2	4	0	21	45	81
	No Response	0	0	0	2	18	20

\* Since more than one school was reported, the response frequencies do not correspond with the N for the group.

\*\* The data for the RD, SO, and RM groups were not detailed enough to permit a further breakdown into Class B, C, or Fleet school.

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Table 15

Median Percentages of Time Spent in Navy Schools Out of Total Time Spent in the Navy

(Job Questionnaire Item No. 16)

Designation	Total		C		1		2		3		SN		No Resp.
	N	Mdn%	n	Mdn%	n	Mdn%	n	Mdn%	n	Mdn%	n	Mdn%	
ET	74	29	6	11*	6	25*	8	23	29	25	25	46	8
SO	109	21	3	6*	8	9	23	16	32	23	43	37	7
RD	188	13	3	5*	4	9*	30	13	54	14	97	15	14
RM	107	13	2	6*	4	7*	10	9	24	11	67	18	5
FC	15	10	4	10*	5	9*	1	--	4	27*	1	--	3

\* Indicates median percentages that are gross approximations due to small samples.

Table 16

Median Percentages of Time Spent Aboard Ship Out of Total Time Spent in the Navy

(Job Questionnaire Item No. 17)

Designation	Total		C		1		2		3		SN		No Resp.
	N	Mdn%	n	Mdn%	n	Mdn%	n	Mdn%	n	Mdn%	n	Mdn%	
ET	81	45	6	60*	7	66*	8	8	31	50	29	35	1
SO	115	60	3	65*	8	72	23	78	31	60	50	43	1
RD	199	70	3	65*	4	81*	30	77	57	71	105	59	3
RM	111	62	3	35*	4	25*	10	55	26	75	68	60	1
JC	18	62	4	52*	5	70*	3	75*	5	60*	1	--	--
EMO	11	49	--	--	--	--	--	--	--	--	--	--	2

\* Indicates median percentages that are gross approximations due to smallness of rate samples.

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Table 17

Frequencies With Which Groups Listed Various Classes of Ships  
Served on Other Than Their Present Class of Ship

(Job Questionnaire Item No. 17)

Class of Ship	ET N = 82	SO N = 116	RD N = 202	RM N = 112	FC N = 18	EMO N = 13
Battleship	2	2	3	0	2	0
Aircraft Carrier	4	3	21	2	7	2
Cruiser	8	1	8	3	3	4
Submarine	3	1	0	1	0	0
Auxiliary Ship	4	4	16	2	1	2
Cargo Ship	3	0	2	9	1	0
Patrol	2	9	14	2	0	2
Landing Vessels	0	1	7	6	1	1
Tanker	0	0	0	1	0	0
Oiler	0	1	2	3	0	0
Mine	0	3	2	3	1	0
Transport	0	1	6	1	0	0
Repair	0	2	1	5	1	0
District	0	1	3	0	0	0
Amphibious	0	1	2	0	2	1
Tender	0	5	0	0	0	1
No Response	7	0	0	5	0	1

Since more than one class of ship was reported, the response frequencies do not correspond with the N for the group.

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Table 18

Median Percentages of Time Spent at Shore Stations Out of  
 Total Navy Time

(Job Questionnaire Item No. 18)

Designation	Total		C		1		2		3		SN		No Resp.
	N	%	n	Mdn	n	%	n	Mdn	n	%	n	Mdn	
ET	82	2	6	30*	7	2*	8	52	29	2	28	1	4
SO	116	1	3	15*	8	26	22	1	27	1	47	1	9
RD	202	1	3	25*	4	2*	27	1	56	2	98	1	14
RM	112	2	3	45*	4	42*	10	2	25	1	68	1	2
FC	18	2	4	15*	5	15*	3	2*	5	1*	1	1	0

Indicates median percentages that are gross approximations due to smallness of rate samples.

Table 19

A List of Hobbies Reported as Contributing to Job Knowledge and the Frequency with Which They Were Reported By Each Group

(Job Questionnaire Item No. 19)

Hobbies*	ET** N = 82	SO N = 116	RD N = 202	RM N = 112	FC N = 18	EMO N = 13
Radio	22	29	8	15	7	4
Electronics	4	6	3	0	0	0
Electricity	7	1	0	2	2	0
Reading	4	3	6	7	0	0
Mechanics	5	3	2	3	0	0
Model Building	2	3	2	0	1	0
Painting	0	2	3	1	0	0
Science	2	0	0	0	0	1
Chemistry	2	0	0	0	0	0
Photography	1	0	2	1	0	0
Music	0	4	0	1	0	0
No Response	48	79	180	88	9	4

\*Hobbies have been grouped into more general categories.

\*\*Since more than one hobby may have been listed, the response frequencies do not correspond with the N for the group.

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Table 20  
Mean Number of Men Supervised By the Indicated Groups  
(Job Questionnaire Item No. 20)

Designation	Total		C		1		2		3		SN		No Response
	N	M	n	M	n	M	n	M	n	M	n	M	
ET	82	2	6	5	7	5	8	4	31	1	29	0	1
SO	116	2	3	9	8	7	22	5	27	3	49	0	7
RD	179	3	2	14	4	18	28	9	47	4	98	0	23
RM	112	2	3	10	4	8	9	7	25	3	66	1	5
FC	18	6	4	10	5	7	3	3	4	4	1	0	1
EMO	13	14	--	--	--	--	--	--	--	--	--	--	1

Job Questionnaire Item No. 21's results are not presented in tabular form. The question asked for a listing of the names, rates, and job titles of the men supervised by the respondent. The purpose of the question was to determine whether or not a man of one rating had occasion to supervise men of ratings other than his own. In addition, information was desired as to the frequency with which a particular rate supervised men of higher rates or different job titles.

With the exceptions shown below, the lists of men supervised contain only those men holding equal or lower rates and the same job title as the supervisor.

The exceptions include one ET/1 who reports that he supervises a RD/SN, and one Leading Radarman (RD/1) who reports the supervision of all sonarmen on his ship.

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Table 21

Frequencies of Selection of Publications That Are Used in Work and Rankings\*  
of Publications in Terms of Frequency of Selection

(Job Questionnaire - Item No. 22)

Publications**	ET (N=82)		SO (N=116)		RD (N=202)		RM (N=112)		PC (N=18)		MO (N=18)	
	f	Rk	f	Rk	f	Rk	f	Rk	f	Rk	f	Rk
Radar Maint. Bull.	71	5	1	20.5	61	12	1	19.5	7	5	13	4
Comm. Elect. Maint. Bull.	72	4	6	15	6	20	14	13	2	12.5	12	6.5
Electron	75	2	57	7	21	18	4	17	5	65	15	1
RAD Series	11	12	2	18.5	119	3	3	18	1	17	6	15.5
DNC Publications	6	14.5	5	16	66	11	106	3	1	17	4	19
JANAP Publications	20	9	20	11	118	4.5	111	1	1	17	8	10.5
Rader Bulletin Series	19	10	2	18.5	80	10	1	19.5	2	12.5	5	17
General Instruct. Books	76	1	94	2.5	102	6	84	5	15	1	12	6.5
ONI Publications	2	19.5	1	20.5	38	17	7	15	3	10	4	19
CNO Publications	6	14.5	19	12	58	14	36	11	4	8.5	6	15.5
General Sig. Books	5	16.5	35	8	120	1.5	55	8	1	17	8	10.5
Sonar Maint. Bull.	36	8	94	2.5	0	21	0	21	4	8.5	8	10.5
NavShips Equipt. Instruct. Books	73	3	88	4	60	13	40	10	12	3	13	4
BuShips Manuals	59	7	78	6	43	16	9	14	9	4	14	2
USF Publications	9	13	98	1	120	1.5	88	4	5	6.5	8	10.5
CSP Publications	4	18	30	9	97	7	66	7	0	20.5	4	19
JANP Publications	17	11	14	14	85	9	77	6	2	12.5	8	10.5
ACP Publications	2	19.5	17	13	118	4.5	107	2	1	17	8	10.5
Fleet Tactical Instruct.	5	16.5	28	10	94	8	16	12	2	12.5	7	14
BUSCI	0	21	3	17	18	19	6	16	0	20.5	2	21
Elect. Textbooks (Educ. Publ)	69	6	84	5	46	15	51	9	14	2	13	4

\*Rank No. 1 indicates publication most frequently selected.

\*\* Five or more individuals wrote in each of the following publications as indicated below:

Publication	Written in By
ATP-1	22 RD's
Trapacs, CIC Publications	16 RD's
Notice to Mariners INR	8 RD's
Pac. Flt. Instructions	8 RD's
Tube Manuals	5 ET's and 1 RM
Dutton Monthly Manual	5 RD's

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Frequencies With Which ET's (N = 78\*) Indicated Responsibilities for Certain Materials  
(Job Questionnaire Item - No. 23)

Table 22

Materials	Order													
	Inventory			Store (Stow)			Maintain Full Allowance of			Distribute				
Electronic Spare Parts	54	64	65	45	37	31	29	27	27	27	27	27	27	27
Trouble Report Forms	12	2	3	3	3	5	5	5	5	5	5	5	5	5
Equipment Operation Records	7	0	0	0	0	0	0	0	0	0	0	0	0	0
Operation Orders	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Status Boards	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Test Equipment	18	25	33	18	13	11	7	3	8	5	4	3	2	1
Equipment Instruction Books	18	20	24	14	12	9	5	0	3	8	5	4	3	2
Maintenance Bulletins	5	7	14	9	12	18	12	12	12	12	12	12	12	12
Other Publications	10	9	14	6	3	4	7	6	9	5	4	3	2	1
Logbooks	3	2	6	3	3	4	7	6	9	5	4	3	2	1
Tools	34	37	39	0	0	0	0	0	0	0	0	0	0	0
Radio Messages & Dispatches	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Others Written In	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Official Correspondence	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Official Photographs	0	0	0	0	0	0	0	0	0	0	0	0	0	0

\* Four ET's did not respond.

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SECURITY INFORMATION

Frequencies With Which SO's (N = 103\*) Indicated Responsibilities for Certain Materials  
(Job Questionnaire Item - No. 23)

Table 23

Materials	Order													
	Inventory			Store (Stow)			Maintain Full Allowance of			Distribute				
Electronic Spare Parts	35	33	24	30	1	1	13	42	50	2	9	14	16	
Trouble Report Forms	14	0	5	19	1	0	39	31	11	0	0	23	0	
Equipment Operation Records	0	0	0	0	0	0	0	0	0	0	0	0	0	
Operation Orders	5	5	5	5	5	5	5	5	5	5	5	5	5	
Status Boards	19	19	19	19	19	19	19	19	19	19	19	19	19	
<b>Test Equipment</b>														
Equipment Instruction Books	16	17	20	10	10	10	10	10	10	10	10	10	10	
Maintenance Bulletins	6	15	18	1	1	1	1	1	1	1	1	1	1	
Other Publications	10	12	17	12	12	12	12	12	12	12	12	12	12	
Logbooks	7	7	12	12	12	12	12	12	12	12	12	12	12	
Tools	15	10	30	0	11	19	19	19	19	19	19	19	19	
Radio Messages & Dispatches	0	0	0	0	40	24	10	0	0	0	0	0	0	
<b>Others Written In</b>														
Lower QPA	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cleaning Gear	12	11	11	11	11	11	11	11	11	11	11	11	11	
Recorder TRR	10	10	10	10	10	10	10	10	10	10	10	10	10	
Pathometer Recorder Paper	0	0	0	0	0	0	0	0	0	0	0	0	0	
Daily Checkoff Logs	0	0	0	0	0	0	0	0	0	0	0	0	0	
Sonar Electronic Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	

\* Thirteen SO's did not respond.

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SECURITY INFORMATION

Frequencies With Which RD's (N = 185\*) Indicated Responsibilities for Certain Materials  
(Job Questionnaire - Item No. 23)

Table 24

Materials	Order													
	Inventory			Store(Stow)			Maintain Full Allowance of			Distribute				
Make Entries on		Safeguard Security of		File		Clean		Repair		Lubricate				
Electronic Spare Parts	0 3 0 0 4		8		10		10		12		12		0	
Trouble Report Forms	0 5 0 0 3		3		15		28		19		18		0	
Equipment Operation Records	0 4 0 0 3		15		36		47		19		12		0	
Operation Orders	0 4 0 0 0		5		15		15		17		15		0	
Status Boards	0 1 0 0 3		3		22		5		13		135		1	
Test Equipment	0 3 0 2		1		66		3		31		67		1	
Equipment Instruction Books	0 2 2 0 1		77		0		10		12		14		0	
Maintenance Bulletins	0 0 3 0 1		0		10		2100		10		14		0	
Other Publications	0 0 1 0 0		4		120		12		14		14		0	
Logbooks	0 0 3 0 0		1		1400		0		0		0		1	
Tools	0 0 4 0 1		0		1100		14		0		14		0	
Radio Messages & Dispatches	0 3 2 0 3		23		10		53		19		57		28	
Others Written In	0 3 2 0 4		32		12		51		32		68		0	
CIC Supplies	2 4 0 0 1		2		17		85		10		7		31	
NET	0 4 3 0 4		4		4		4		4		4		4	
Electronic Equipment	0 3 2 0 1		44		1		58		41		24		28	
Charts	0 3 2 0 1		44		1		58		41		24		28	
Publications	0 3 2 0 1		44		1		58		41		24		28	

\* Seventeen RD's did not respond.

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Table 25

SECURITY INFORMATION  
Frequencies With Which RN's (N = 109\*) Indicated Responsibilities for Certain Materials  
 (Job Questionnaire - Item No. 25)

Materials	Order	Inventory	Store(Stow)	Maintain Full Allowance of	Distribute	Make Entries on	Safeguard Security of	File	Clean	Repair	Lubricate	Calibrate	Supervise Use of	Train in Use of	Insert Published Changes in	Check Correctness of	
Electronic Spare Parts	0	1	1	1													
Trouble Report Forms	0	1	1	0													
Equip. Operation Records	1	0	1	3													
Operation Orders	1	0	1	0													
Status Boards																	
Test Equipment																	
Equip. Instruction Books	0	0	1	0													
Maintenance Bulletins	1	0	1	6													
Other Publications	0	13	17	4													
Logbooks	3	4	10	17													
Tools	1	1	5	2													
Radio Messages & Disp's	11	7	28	82													
Others Written In																	
JAMPS & ACP																	
Circuit Logs																	
Supplies																	
Radio Transmitters																	
All Radio Materials																	
Cleaning Stations																	
Radio Central																	

\* Three RM's did not respond.

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Table 26

Frequencies With Which FC's (N = 18) Indicated Responsibilities for Certain Materials  
(Job Questionnaire - Item No. 25)

Materials	Order
Electronic Spare Parts	
Trouble Report Forms	
Equipment Operation Records	
Operation Orders	
Status Boards	
Test Equipment	10107
Equipment Instruction Books	10117
Maintenance Bulletins	10215
Other Publications	10105
Logbooks	083NN64
Tools	0924444
Radio Messages & Dispatches	10014
Others Written In	040NN40
None	01173221
	10191
	0376661
	0146750
	0600003
	0200002
	0300001
	0100002
	0100001
	0200002
	0110.
	011297882
	0020001
	0020001
	0000000

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Table 27

Frequencies With Which EMO's ( $N = 9^*$ ) Indicated Responsibilities for Certain Materials  
(Job Questionnaire Item - No. 23)

Materials	Order	Inventory	Store(Stow)	Maintain Full Allowance of	Distribute	Make Entries on	Safeguard Security of	File	Clean	Repair	Lubricate	Calibrate	Supervise Use of	Train in Use of	Insert Published Changes in	Check Correctness of
Electronic Spare Parts	5	1	1													
Trouble Report Forms	1	1	1													
Equipment Operation Records	1	1	1													
Operation Orders																
Status Boards																
Test Equipment																
Equipment Instruction Books	13246	00114														
Maintenance Bulletins	12334	00114														
Other Publications	11224	00114														
Logbooks																
Tools																
Radio Messages & Dispatches																
Others Written In	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CSIP																
Tender Repair Request																

Four EMO's did not respond.

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Job Questionnaire Item No. 24 is not tabulated in this supplement. Individual responses were given at many different levels of generality and could not readily be combined into a single table.

Table 28

Frequencies of Selection By Groups of Responsibilities Assumed for Electronic Equipment and the Relative Rank of Each in Terms of Frequency of Selection  
(Job Questionnaire Item - No. 25)

Items of Responsibility	ET		SO		RD		RM		FC		EMO	
	N=82	f	N=116	f	N=202	f	N=112	f	N=18*	f	N=13*	f
Operation	42	16	107	1	180	1.5	77	4	18		6	
Routine Cleaning	48	14	103	3	164	4	90	3	17		6	
Record Meter Readings	41	17	66	13	65	9	35	9	15		5	
Routine Lubrications	62	11	82	7.5	64	10	29	11	17		6	
Calibration	66	8	73	10.5	151	5	64	5	15		7	
Change Tubes	73	2	83	5.5	36	14	28	13	17		6	
Replace Tubes	71	4	83	5.5	38	12.5	29	11	16		6	
Replace Fuses	74	1	84	4	51	11	21	14	17		6	
Make Major Repairs	64	10	40	16	0	16.5	0	17	11		5	
Supply Parts	65	9	28	17	0	16.5	1	15.5	9		6	
Tune	69	5.5	73	10.5	170	3	95	2	12		6	
Start and Stop	51	13	105	2	180	1.5	97	1	17		5	
Adjust	69	5.5	82	7.5	116	7	62	6	17		7	
Instruction	43	15	61	14	88	8	41	8	16		7	
Keep Maint. Records	68	7	76	9	119	6	52	7	15		6	
Make Field Changes	61	12	43	15	2	15	1	15.5	6		6	
Clean, Adjust Contacts	72	3	71	12	38	12.5	29	10	16		6	
No Response		2		5		7		5		0		3

\* Ranks not presented because of large number of ties.

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Table 29

Frequencies of Selection of Records That Are Kept as Part of Job  
and the Relative Rank of Each in Terms of Frequency of Selection

(Job Questionnaire - Item No. 26)

Records in Given List	ET N=82		SO N=116		RD N=202		RM N=112		FC N=18		EMO N=13	
	f	Rk	f	Rk	f	Rk	f	Rk	f	Rk*	f	Rk*
Elect. Equipment History	62	3.5	51	9	18	17	3	13.5	7		8	
Field Change Records	62	3.5	45	11	3	20.5	2	16.5	5		8	
Resistance Test Records	32	13	22	15	0	25	0	23.5	9		8	
Alteration Record	29	14	27	13	2	22.5	2	16.5	8		9	
Repair Records	63	2	56	7.5	9	19	3	13.5	13		9	
Custody Records	22	15.5	16	18	34	15	17	12	8		10	
Equip. Installation Rec.	39	10	40	12	1	24	2	16.5	9		11	
Stand. Navy Stock Cards	55	7	9	19	12	18	2	16.5	9		8	
CIC Logs	0	23	4	20	152	2	1	20	0		2	
Training Schedule	15	17	50	10	59	12	38	7	5		9	
Operation Sched. & Plans	1	19.5	17	16.5	68	11	28	10	2		4	
Tactical Charts	0	23	3	21	83	10	0	23.5	0		1	
Equipment Logs	22	15.5	74	5	113	4	32	8.5	17		1	
Radio Logs	1	19.5	0	6	175	1	90	1	0		0	
Corrective Maint. Rec.	56	6	59	6	40	14	32	8.5	13		9	
Daily Checklists(Equip.)	35	11.5	76	2.5	102	8.5	60	4.5	17		6	
Weekly Checklists(Equip.)	35	11.5	76	2.5	111	5	63	3	17		6	
Monthly Checklists(Equip.)	42	9	75	4	104	7	60	4.5	15		6	
Elect. Service Repair Rep.	44	8	26	14	2	22.5	0	23.5	5		9	
Failure Report	69	1	56	7.5	20	16	27	11	12		8	
Operating Log	3	18.	86	1	110	6	55	6	15		1	
Radio Oper. Recorder Log	0	23	0	24	118	3	70	2	0		0	
Strategic Chart	0	23	0	24	45	13	1	20	0		0	
DRT Log	0	23	1	22	102	8.5	0	23.5	0		1	
Spare Parts Records	58	5	17	16.5	3	20.5	1	20	10		8	
No Response	4		18		9		10		0		1	

\* Ranks not presented because of large number of ties.

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Table 30

Frequencies of Selection by Indicated Groups of Tools Used, and the  
Relative Rank of Each in Terms of Frequency of Selection

(Job Questionnaire - Item No. 27)

Tools Used	FT N=82		SO N=116		RD N=202		RM N=112		FC N=18		EMO N=13	
	f	Rk	f	Rk	f	Rk	f	Rk	f	Rk*	f	Rk*
Screwdrivers	81	1	109	1	120	6	53	3	18		7	
Long nose pliers	80	2	101	3	59	7	36	4	18		6	
Files	76	6	78	7	36	11.5	18	5	18		5	
End wrenches	74	8.5	86	6	33	14	9	14	18		5	
Allen wrenches	78	4.5	87	4.5	51	9	11	10.5	18		6	
Hammers	72	12	68	7	45	10	17	6	18		3	
Dike pliers	74	8.5	66	8	19	19	10	12.5	15		3	
Drilis	72	12	64	9	34	13	16	7	18		5	
Power drill	55	17	50	14.5	32	15	10	12.5	16		3	
Blow torch	9	24.5	2	26.5	0	30	0	28.5	5		2	
Punches	65	16	54	11	24	18	5	18	15		2	
Hacksaws	66	14.5	53	12	25	17	7	15.5	16		3	
Tap and die	37	20	28	19.5	10	24	2	22.5	17		3	
Soldering guns	79	3	76	8	16	20.5	13	8	13		5	
Parallel ruler	8	26	41	16	175	3	7	15.5	4		6	
Bandsaws	0	31	1	28	0	30	0	28.5	1		0	
Pencils	75	7	107	2	198	1	109	1.5	17		11	
DRT arm	0	31	28	19.5	197	2	2	22.5	0		4	
Nautical slide rules	2	28.5	12	23	155	5	0	28.5	2		3	
Alignment tools	72	12	50	14.5	12	23	3	20.5	14		3	
Strippers	52	18	37	18	2	27	3	20.5	14		3	
Typewriters	47	19	38	17	56	8	109	1.5	5		6	
Crescent wrenches	78	4.5	87	4.5	36	11.5	11	10.5	18		6	
Socket wrenches	73	10	61	10	16	20.5	6	17	18		3	
Hand drill	66	14.5	51	13	28	16	12	9	16		5	
Welding equipment	3	27	2	26.5	0	30	0	28.5	0		0	
Lathe	2	28.5	0	29.5	0	30	0	28.5	2		0	
Milling machine	0	31	0	29.5	0	30	0	28.5	0		0	
Drill press	14	23	5	24	9	25	0	28.5	1		1	
Reamers	18	22	4	25	5	26	0	28.5	16		2	
Dividers	9	24.5	22	21	174	4	1	24	11		6	
Grinder	27	21	18	22	15	22	4	19	8		3	

\* Ranks not presented because of large number of ties.

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Table 31

Frequencies of Selection of Test Equipment Used in Work Aboard Ship and the Rank of Each in Terms of Frequency of Selection

(Job Questionnaire - Item No. 28)

Test Equipment	ET N <sub>82</sub>		SO N <sub>116</sub>		RD N <sub>202</sub>		RM N <sub>112</sub>		FC N <sub>18</sub>		EMO N <sub>13</sub>	
	f	Rk	f	Rk	f	Rk	f	Rk	f	Rk*	f	Rk*
Oscilloscope	76	2.5	37	6	41	4	12	10.5	16			7
Echo Box	70	10	4	22	97	1	0	27.5	9			7
Frequency Meter	72	8	24	10	37	5	96	1	5			5
Signal Generator	69	11	45	5	22	9	3	18	3			6
Vacuum-tube Voltmeter	67	13.5	47	4	14	13	8	13	13			7
Multimeter	73	6.5	64	3	10	18.5	6	15.5	6			7
Tube Tester	76	2.5	83	1	56	3	46	3	17			6
Analyzer	46	17.5	11	14	8	21.5	0	27.5	18			3
Field Intensity Meter	6	31	5	21	3	26	0	27.5	1			1
Beat-Freq. Oscillator	42	20	35	7	11	16	32	4	1			3
Range Calibrator	45	19	8	16.5	59	2	5	17	1			2
Standing-Wave Indicator	23	28	1	27.5	12	14	0	27.5	1			2
Radar Test Set	29	26	1	27.5	8	21.5	0	27.5	1			5
Resistance Bridge	34	23	6	19.5	2	28.5	0	27.5	4			1
Voltohmmeter	71	9	66	2	18	10.5	7	14	16			3
Strain Gage	1	32	2	24	0	32	0	27.5	0			1
Wattmeter	68	12	2	24	17	12	20	7	3			5
Signal Strength Meter	25	27	10	15	11	16	10	12	2			2
Meggar	75	5	20	11	3	26	6	15.5	18			6
Capacity Bridge	41	21	0	31	2	28.5	0	27.5	2			1
Milliammeter	73	6.5	17	12.5	18	10.5	16	8.5	10			5
Voltmeter	76	2.5	26	9	31	6.5	21	6	17			5
Ohmmeter	76	2.5	27	8	31	6.5	12	10.5	18			5
Dummy Antenna	67	13.5	0	31	23	8	65	2	6			5
Galvanometer	14	29	1	27.5	1	30.5	0	27.5	10			1
Microammeter	32	25	2	24	4	23.5	1	20.5	5			2
Ammeter	53	16	17	12.5	10	18.5	16	8.5	13			5
Audio Oscillator	61	15	7	18	3	26	23	5	2			5
Signal Tracer	39	22	8	16.5	9	20	1	20.5	1			1
Condenser Checker	46	17.5	6	19.5	4	23.5	1	20.5	5			2
Rectifier Meter	11	30	1	27.5	1	30.5	1	20.5	1			1
Wave Meter	33	24	0	31	11	16	0	27.5	1			2
No Response	2		21		75		8		0			7

\* Ranks not presented because of large number of ties.

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Table 32

Percentages of Indicated Groups Checking Various Equipment Maintenance Activities as Being Required, Forbidden, or Neither Required Nor Forbidden By Their Supervisors; and the Percentages of Each Group Indicating Whether or Not They Do the Activity

(Job Questionnaire - Item No. 29)

Dust Exterior

Order of Supervisor	ET N=82	SO N=116	RD N=202	RM N=112	FC N=18
	% of Group				
Required	29	78	82	75	83
Forbidden	0	1	0	0	0
Neither	54	10	9	4	6
No Response	17	11	9	21	11
Do	50	78	67	68	78
Don't Do	29	8	5	4	5
No Response	21	14	28	28	17

Dust Interior

Order of Supervisor	ET N=82	SO N=116	RD N=202	RM N=112	FC N=18
	% of Group				
Required	45	70	66	62	78
Forbidden	0	3	2	6	0
Neither	41	16	15	9	11
No Response	14	11	17	23	11
Do	70	75	63	56	78
Don't Do	16	9	16	15	5
No Response	14	16	21	29	17

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Table 32 (Continued)

Replace Fuses

Order of Supervisor	ET	SO	RD	RM	FC
	N=82	N=116	N=202	N=112	N=18
% of Group					
Required	71	52	19	10	94
Forbidden	0	9	17	15	0
Neither	13	29	38	46	0
No Response	16	10	26	29	6
Do	83	41	25	18	78
Don't Do	1	15	48	48	0
No Response	16	44	27	34	22

Replace Receiver Type Vacuum Tubes

Order of Supervisor	ET	SO	RD	RM	FC
	N=82	N=116	N=202	N=112	N=18
% of Group					
Required	74	44	5	12	78
Forbidden	0	9	37	24	0
Neither	11	33	32	38	11
No Response	15	14	26	26	11
Do	83	62	9	20	67
Don't Do	1	21	64	49	5
No Response	16	17	27	31	28

Replace Components Soldered in Place

Order of Supervisor	ET	SO	RD	RM	FC
	N=82	N=116	N=202	N=112	N=18
% of Group					
Required	78	37	1	2	89
Forbidden	0	15	42	32	0
Neither	10	25	30	36	6
No Response	12	23	27	30	5
Do	82	54	3	5	78
Don't Do	1	31	68	63	0
No Response	17	15	29	32	22

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Table 33

Non-electronic Duties and the Percentage of Time Spent By the Group on Each  
Based Upon the Aggregate Time Spent on All the Non-electronic Duties  
Listed By a Group

(Job Questionnaire - Item No. 30)

Non-electronic Duty	ET N=52 f*	SO N=116 f %	ED N=202 f %	EM N=112 f %	FC N=18 f %
Petty Officer Duties	15 17	30 26	30 8	10 4	5 14
Working Parties	20 18	12 2	12 2	12 5	0 0
Cleaning	7 6	57 37	80 28	40 24	0 0
Misc. (Driver, Medical, Athletic, etc.)	3 4	9 1	29 8	6 1	0 0
Supervising	0 0	12 12	30 17	11 14	2 8
Equipment Operating (E)	0 0	8 2	5 1	16 20	1 1
Phone Talker	1 1	1 1	3 1	0 0	0 0
Study and Training	0 0	2 1	12 4	3 3	0 0
Non-elect. Maint. of Equipment	0 0	3 1	3 1	0 0	10 52
Charts, Records, Publi- cation Keeping	0 0	0 0	21 7	20 8	1 4
Gangway Watch	12 10	56 15	0 0	0 0	0 0
Standing Watch	1 3	0 0	84 20	0 0	0 0
Shore Patrol	15 18	0 0	0 0	0 0	0 0
Mess Cooking	3 9	0 0	0 0	0 0	0 0
Switchboard Watch	4 7	0 0	0 0	0 0	0 0
Electrician Watch	2 6	0 0	0 0	0 0	0 0
General Quarters	2 1	0 0	0 0	0 0	0 0
Messenger Watch	1 1	0 0	0 0	0 0	0 0
Movie Operator	1 1	0 0	0 0	0 0	0 0
Bathythermograph Handling	0 0	2 1	0 0	0 0	0 0
Plotter	0 0	0 0	10 4	0 0	0 0
Writing, Filing, Routing Messages	0 0	0 0	0 0	30 22	0 0
Upkeep of Spare Parts	0 0	0 0	0 0	0 0	1 1
Alignment of Guns	0 0	0 0	0 0	0 0	4 17
Transmission Checks	0 0	0 0	0 0	0 0	1 2

\* Since more than one non-electronic duty may be listed by an individual, the total number of responses may not correspond with the N for the group.

Note 1: The percentage estimates given by the individuals within each rating were weighted by the frequency of responses within the percentage interval. All the weighted percentages were then summed and this total used to divide the weighted sum of each duty category to get a percentage which represents that portion of time spent on a non-electronic duty by the entire group out of the aggregate time spent on all non-electronic duties.

Note 2: The symbol (E) designates electronic duties although the question specified non-electronic duties.

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Table 34

Percentages of Time Spent on Various Non-electronic Duties By the EMO's  
Based Upon the Aggregate Time Spent on All Non-electronic Duties

(Job Questionnaire - Item No. 30)

Non-Electronic Duty Categories	EMO N=13	
	#	%
General Line Duties	8	32
Engineering	1	13
Division Officer Duties	3	11
Officer of the Day	2	9
Study and Training	3	6
Damage Control	2	6
Electronics (E)	1	6
Collateral	4	5
Coding Board	3	5
CIC Watch	1	3
Investigating Officer	1	2
Mess Treasurer	1	1
Electrical Officer	1	1
Housing Officer	1	1
Assist. Operations Officer	1	1

\* Since more than one non-electronic duty may be listed by an officer, the total number of responses does not correspond with the N for the group.

1. Note: For a description of the method used in determining the percentages shown above see Note 1, Table 33.
2. Note: The symbol (E) designates electronic duties although the question specified non-electronic duties.

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Table 35

Duties Performed When Not on Watch or at Battle Stations and the Percentage of Time Spent By the Group on Each Based Upon the Aggregate Time Spent on All Such Duties Listed By a Group

(Job Questionnaire - Item No. 31)

Duties Performed When Not On Watch Or At Battle Stations	ET N=82	SO N=116	RD N=202	EM N=112	FC N=18
	f %	f %	f %	f %	f %
Records and Reports	37 15	16 5	13 2	22 9	9 7
Maintenance (Corrective and Preventive)	98 55	31 10	27 3	8 2	27 47
Supervision	7 5	21 15	38 15	0 0	6 22
Spare Parts and Supplies Maintenance	22 8	0 0	0 0	2 1	1 1
Instruction and Training	7 2	16 5	44 8	36 16	1 1
Cleaning and Upkeep of Spaces	17 4	72 40	114 48	57 32	1 1
Study	15 4	0 0	0 0	0 0	0 0
Operating Equipment	1 1	9 5	0 0	12 6	7 10
Stand By	1 1	0 0	0 0	0 0	1 8
General Watches	0 0	0 0	10 3	0 0	1 3
Misc. (Typing, Laundry, Mess Cook, etc.)	14 6	34 7	30 7	22 12	0 0
Petty Officer Duties	0 0	24 10	12 3	6 2	2 1
Ship Security	0 0	3 1	22 4	0 0	1 1
Routing Messages	0 0	0 0	0 0	7 5	0 0
Working Parties	0 0	11 2	21 2	9 3	0 0
Publication and Chart Correction	0 0	0 0	21 5	18 6	0 0
Talker	0 0	0 0	2 1	0 0	0 0

\* Since more than one duty may be listed by an individual, the total number of responses may not correspond with the N for the group.

Note: For a description of the method used in determining the percentages shown above see Note 1, Table 33.

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Table 36

Percentages of Time Spent By the IMO's on Various Duties Performed When Not on Watch or at Battle Stations Based Upon the Aggregate Time Spent on All Such Duties

(Job Questionnaire - Item No. 31)

Duties Performed When Not on Watch or at Battle Stations	IMO N = 13	
	f*	%
Electronics Repair Supervision	7	27
Non-electronics Supervision	5	6
Training of Personnel	3	7-
Asst. Operations Officer	1	1
Inspections	1	1
Discipline	1	7
Mess Caterer	1	2
Division Officer	3	7
Electrical Officer	2	7
Investigating Officer	1	7
Special Assignments	2	5
Damage Control	1	7
Study	1	1
Record Keeping	4	15
Collateral Duties	2	2

\* Since more than one duty may be listed by an officer, the total number of responses does not correspond with the N for the group.

Note:—For a description of the method used in determining the percentages shown above, see Note 1, Table 33.

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Table 37

Special Sea Details, The Frequencies and Percentages of Group Listings  
(Job Questionnaire - Item No. 32)

Special Sea Details	ET N=82 f %	SO N=116 f %	HD N=202 f %	EM N=112 f %	PC N=18 f %	EMO N=13 f %
General Quarters	5 6	4 3	5 2	6 5	0 0	0 0
Phone Talker	0 0	8 7	20 10	0 0	2 11	0 0
Colors	0 0	12 10	2 1	4 3	0 0	0 0
Supervision	0 0	0 0	20 10	10 9	2 11	0 0
Bridge Watch	0 0	10 9	5 2	0 0	0 0	0 0
Master At Arms	0 0	1 1	0 0	0 0	1 6	0 0
Plotting	0 0	0 0	15 9	0 0	1 6	0 0
Messenger	0 0	0 0	2 1	5 4	0 0	0 0
Fueling Station	0 0	0 0	1 0.5	0 0	1 6	0 0
Standby Repair Shack	11 13	0 0	0 0	0 0	0 0	0 0
ET Repair	4 5	0 0	0 0	0 0	0 0	0 0
Standby on Equipment:						
Radio Central	9 11	0 0	0 0	0 0	0 0	0 0
CIC	3 4	0 0	0 0	0 0	0 0	0 0
Sonar	1 1	0 0	0 0	0 0	0 0	0 0
Operating Sonar Equipment	0 0	56 48	0 0	0 0	0 0	0 0
Radar Operator	0 0	0 0	86 42	0 0	0 0	0 0
Fathometer Operator	0 0	0 0	3 1.5	0 0	0 0	0 0
Log Keeper	0 0	0 0	7 3	0 0	0 0	0 0
Radio Communicator	0 0	0 0	8 4	0 0	0 0	0 0
Radio Operator	0 0	0 0	0 0	31 28	0 0	0 0
Bridge Recorder	0 0	0 0	0 0	3 3	0 0	0 0
Forecastle, Fantail Lines	0 0	0 0	0 0	0 0	9 50	0 0
Engine Room	0 0	0 0	0 0	0 0	0 0	3 23
Radar Transmitter Room	0 0	0 0	0 0	0 0	0 0	1 8
Starboard Side, Midship	0 0	0 0	0 0	0 0	0 0	1 8
On Call	0 0	0 0	0 0	0 0	0 0	1 8
Non-electronic	0 0	0 0	0 0	0 0	0 0	1 8
No Response	49 60	25 22	25 12	53 47	2 11	6 46

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Table 38

A List of Special Sea Detail Duties and the Percentage of Time Spent By the Group on Each Based Upon the Aggregate Time Spent on All the Duties Listed By a Group

(Job Questionnaire - Item No. 33)

Special Sea Detail Duties	ET N=82 f %	SO N=116 f %	ED N=202 f %	RM N=112 f %	FC N=18 f %
Supervising	1 1	3 1	24 11	9 19	1 8
Standby	14 50	8 6	2 1	4 10	0 0
Miscellaneous (Messenger, Policing, etc.)	0 0	12 9	23 9	13 12	2 0.5
Telephone Talker	0 0	8 8	53 18	0 0	1 0.3
Setting Up Radio Circuits	13 24	0 0	0 0	8 9	0 0
Colors	0 0	12 3	0 0	3 4	0 0
Radio Operating	0 0	0 0	24 6	22 39	0 0
Recorder & Log Keeping	0 0	5 2	24 7	0 0	0 0
Plotting	0 0	4 3	62 20	0 0	0 0
Checking Operations	8 13	0 0	0 0	0 0	0 0
Securing of Gear	1 1	0 0	0 0	0 0	0 0
Maintaining & Repairing Equipment	7 12	0 0	0 0	0 0	0 0
Sonar Equipment Operating	0 0	78 51	0 0	0 0	0 0
Engine Room - Telegraph Operator	0 0	5 6	0 0	0 0	0 0
General Quarters	0 0	2 2	0 0	0 0	0 0
Radar Navigating	0 0	0 0	23 8	0 0	0 0
Routing Messages	0 0	0 0	0 0	7 8	0 0
Switchboard Operating	0 0	0 0	0 0	0 0	1 8
Securing Lines	0 0	0 0	0 0	0 0	14 72
Relay Orders	0 0	0 0	0 0	0 0	3 12
Radar Operating	0 0	0 0	68 22	0 0	

Since more than one special sea detail duty may be listed by an individual, the total number of responses may not correspond with the N for the group.

Note.--For a description of the method used in determining the percentages shown above, see Note 1, Table 33.

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Table 39

A List of Special Sea Detail Duties and the Percentages of Time Spent By the EMO Group on Each, Based Upon the Aggregate Time Spent on All the Duties Listed

(Job Questionnaire - Item No. 33)

Special Sea Detail Duties	f*	E40 N = 13 %
Standby, Engine Room	2	40
Supervising, Engineering Dept.	1	20
Inspection of Personnel	1	18
Standby	1	18
Insure Proper Rigging of Bow, Fender	1	2
Adjusting Equipment	1	1
Investigating Trouble	1	1

Since more than one duty may be listed by an officer, the total number of responses does not correspond with the N for the group.

Note.—For a description of the method used in determining the percentages shown above see Note 1, Table 33.

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Table 40

The Frequency and Per Cent of Each Group Taken From Regularly Assigned Work  
 and the Duties to Which They Were Called  
 (Job Questionnaire - Item No. 34)

	ET		SO		ED		EM		FC		EMO	
	N=82	f %	N=116	f %	N=202	f %	N=112	f %	N=18	f %	N=13	f %
No	42	51	40	35	92	46	56	50	11	61	9	69
No Response	3	4	13	11	15	7	6	5	0	0	1	8
Yes	37	45	63	54	95	47	50	45	7	39	3	23
Working Parties*	23	28	34	29	58	29	36	32	5	28	0	0
Shore Patrol	1	1	1	1	7	3.5	0	0	1	6	0	0
Mess Cooking	3	4	1	1	6	3	0	0	0	0	0	0
Cleaning	1	1	0	0	12	6	6	5	0	0	0	0
Painting	2	2	0	0	0	0	2	2	0	0	0	0
Movie Operator	1	1	1	1	0	0	0	0	0	0	0	0
General Drill	1	1	0	0	0	0	0	0	1	6	0	0
Guard Mail	0	0	2	2	14	7	0	0	0	0	0	0
Clerical Work	0	0	0	0	0	0	2	2	1	6	0	0
Laundry	3	4	0	0	0	0	0	0	0	0	0	0
Diving	1	1	0	0	0	0	0	0	0	0	0	0
Fire and Rescue	1	1	0	0	0	0	0	0	0	0	0	0
CIC Watch	0	0	13	11	0	0	0	0	0	0	0	0
Radar Watch	0	0	7	5	0	0	0	0	0	0	0	0
Assist ET	0	0	1	1	0	0	0	0	0	0	0	0
Voice Radio	0	0	1	1	0	0	0	0	0	0	0	0
Courts-Martial Board	0	0	0	0	0	0	0	0	0	0	1	8
Trips to Other Ships	0	0	0	0	0	0	0	0	0	0	2	15
Legal Work	0	0	0	0	0	0	0	0	0	0	1	8
Watch Standing	0	0	0	0	0	0	0	0	0	0	1	8

\* The following duties were given along with the "Yes" responses. Since more than one response may be given by an individual, the total number of duties may not correspond with the number of "Yes" responses.

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Table 41

The Frequencies and Percentages of Each Group Listing Their Battle Stations  
(Job Questionnaire - Item No. 35)

Battle Station	ET	N = 82	f	%	SO	N = 116	f	%
Radio Central	22	27			Stack Operator	37	32	
ET Shop	20	24			Talker	22	19	
FC Radar	17	21			Range Recorder	13	11	
CIC	10	12			Depth Charge Firing	11	9	
RCM	2	2			Supervisor	9	8	
Quarterdeck	2	2			Attack Plotter	8	7	
FC Transmitter Room	1	1			Stack Standby	5	4	
Radar Transmitter Room	1	1			Ammunition Handler	3	3	
Sonar	1	1			Fathometer	2	2	
40 MM Gun Mount	1	1			Short Pulse Recorder	1	1	
No Response	5	6			Messenger	1	1	
					Port Lookout	1	1	
					Log Information	1	1	
					Not Assigned	1	1	
					No Response	1	1	

Battle Station	RD	N = 202	f	%	RM	N = 112	f	%
Operator	39	19			Operator	75	67	
CIC Unspecified	32	16			Talker	11	10	
DRT Plot	28	14			Supervisor	10	9	
Air Plot	23	11			Messenger	4	3	
RPU Operator	22	10			Ammunition Handling	4	3	
S/P Talker	18	9			Recorder	2	2	
Supervisor	14	7			Not Assigned	1	1	
Summary Plot	8	4			No Response	5	4	
Status Board	4	2						
RCM	3	15						
Messenger	2	1						
No Response	9	5						

Note: Battle stations for groups other than ETs have been listed in terms of duty at stations. For ETs, the station is listed.

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Table 41, Continued

Battle Station	FC	
	f	%
Supervisor	5	28
FC Plot	3	17
26 Radar Operator	2	11
Radar Range Operator	2	11
Repair	1	5
Range Operator on Computer	1	5
Trainer Main Battery	1	5
Switchboard Operator	1	5
No Response	2	11

Battle Station	ENO	
	f	%
Electronics Repair Party	6	46
Air Defense	2	15
Damage Control	2	15
Main Control	1	8
Main Engine	1	8
No Response	1	8

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Table 42

A List of Duties Performed at Battle Stations and the Percentage of Time Spent  
By the Group on Each Based Upon the Aggregate Time Spent on All the  
Battle Station Duties Listed By a Group

(Job Questionnaire - Item No. 36)

Battle Station Duties	ET N=82 f* %	SO N=116 f %	RD N=202 f %	EM N=112 f %	FC N=18 f %
Phone Talker	7	6	70 31	43 14	50 25
Records and Logs	3	1	6 2	18 6	2 1
Miscellaneous (Handle Ammo, Fire Hose)	19	11	13 4	9 1	29 10
Supervision	0	0	30 8	17 5	21 10
Standby - On Call	26	30	0 0	8 2	7 5
Operate Equipment	21	17	104 34	0 0	68 29
Plot & Report Target Movements	0	0	28 7	94 33	0 0
Instruction	4	2	2 1	0 0	2 1
Check Equipment	27	12	0 0	0 0	0 0
Repair Equipment	19	8	0 0	0 0	0 0
Maintain Equipment	36	12	0 0	0 0	0 0
Study	2	1	0 0	0 0	0 0
Cleaning	1	0.5	0 0	0 0	0 0
Assist ASW Officer	0	0	11 2	0 0	0 0
Coordinate Sonar Reports	0	0	8 2	0 0	0 0
Firing Duties	0	0	16 9	0 0	0 0
Radar Operator	0	0	0 0	70 25	0 0
Radio Operator	0	0	0 0	41 12	0 0
Evaluation	0	0	0 0	5 2	0 0
RCM Operator	0	0	0 0	2 1	0 0
Messenger	0	0	0 0	2 1	0 0
Write-Up, Route, and File Messages	0	0	0 0	0 0	44 10
FC Radar Operator	0	0	0 0	0 0	0 0
Computer Operator	0	0	0 0	0 0	7 24
Transmission Checks	0	0	0 0	0 0	8 21
FC Switchboard Check & Operation	0	0	0 0	0 0	4 4
Operate Windbox	0	0	0 0	0 0	2 1
Bearing Operator	0	0	0 0	0 0	2 10

Since more than one duty may be listed by an individual, the total number  
of responses may not correspond with the N for the group.

Note.—For a description of the method used in determining the percentages  
shown above, see Note 1, Table 33.

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Table 43

A List of Battle Station Duties and the Percentage of Time Spent by EMO's on Each Based Upon the Aggregate Time Spent on All the Duties Listed

(Job Questionnaire - Item No. 36)

Battle Station Duties	N <sup>a</sup>	EMO N = 13	%
Direct Repair - Electronics Equipt.	5		28
Stand By	5		31
Plane or Tow Coordinator	2		15
Gun Fire Control	2		1
Damage Control Report	1		1
Adjust Equipment	1		0.5
Supervision in Engineering Dept.	1		8
Electrical Casualty Control	1		8
Investigating Troubles	1		0.5
Gun Direction Control	1		8

\* Since more than one duty may be listed by an individual, the total number of responses may not correspond with the N for the group.

Note.—For a description of the method used in determining the percentages shown above, see Note 1, Table 33.

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Table 44

Import Watch Stations, the Frequencies and Percentages of Each Group Listing Them

(Job Questionnaire - Item No. 37)

Import Watch Station	ET N=82 f %	SO N=116 f %	RD N=202 f %	RM N=112 f %	FC N=18 f %	EMO N=13 f %
Quarterdeck	20 24	70 60	60 30	2 2	15 83	11 85
Radio Central	2 2	5 4	4 2	89 79	0 0	0 0
Messenger (Gangway, Bow, etc.)	2 2	20 17	41 20	0 0	0 0	0 0
Security Patrol	0 0	5 4	12 6	0 0	2 11	0 0
CIC	1 1	0 0	60 30	0 0	0 0	0 0
Sentry (Fantail, Bow, etc.)	0 0	5 4	7 3	0 0	0 0	0 0
Engine Room	2 2	0 0	0 0	0 0	0 0	0 0
ET Shop	31 38	0 0	0 0	0 0	0 0	0 0
Main Generator Switchboard	1 1	0 0	0 0	0 0	0 0	0 0
Fire Party	2 2	0 0	0 0	0 0	0 0	0 0
Movie Operator	1 1	0 0	0 0	0 0	0 0	0 0
Sonar Cleaning Station	0 0	1 1	0 0	0 0	0 0	0 0
Radio Central Supervision	0 0	0 0	0 0	8 7	0 0	0 0
Radio Central Messenger	0 0	0 0	0 0	5 4	0 0	0 0
Mail Clerk	0 0	0 0	0 0	1 1	0 0	0 0
No Response	20 24	10 9	18 9	7 6	1 6	2 15

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Table 45

A List of Duties Performed on Import Watch and the Percentage of Time Spent By the Group on Each Based Upon the Aggregate Time Spent on All the Import Watch Duties Listed By a Group

(Job Questionnaire - Item No. 38)

Import Watch Duties	ET N=82		SO N=116		RD N=202		EM N=112		FC N=18	
	f	%	f	%	f	%	f	%	f	%
Supervision	2	0.5	18	4	29	6	23	11	8	10
Radio Operation	8	2	6	2	55	26	92	44	0	0
Miscellaneous	17	9	60	21	35	6	34	7	0	0
Keeping Logs and Records	13	5	51	15	77	15	0	0	10	16
Petty Officer Watch	0	0	23	11	44	11	2	2	2	1
Equipment Repair	45	35	2	1	0	0	18	3	0	0
Messenger	3	3	16	8	45	12	0	0	0	0
Ship Security	0	0	64	29	51	15	0	0	10	24
Assist O.O.D.	0	0	12	5	4	1	0	0	5	12
Quarterdeck Watch	37	20	0	0	0	0	0	0	3	12
Standby	11	13	0	0	9	3	0	0	0	0
Cleaning	4	1	0	0	0	0	41	6	0	0
Colors	0	0	8	1	6	1	0	0	0	0
Guard Mail	0	0	3	1	7	1	0	0	0	0
Correct Publication & Charts	0	0	0	0	6	1	7	1	0	0
Instruction & Training	0	0	0	0	2	1	15	3	0	0
Working Parties	2	1	0	0	0	0	0	0	4	3
Pipe All Words	0	0	10	2	0	0	0	0	2	2
Movie Operator	4	2	0	0	0	0	0	0	0	0
Spares, Organization & Upkeep	9	5	0	0	0	0	0	0	0	0
Shore Patrol	1	0.3	0	0	0	0	0	0	0	0
Electrician Watch	8	3	0	0	0	0	0	0	0	0
Boat Scheduling	0	0	8	1	0	0	0	0	0	0
Muster Prisoners	0	0	0	0	4	1	0	0	0	0
Preventive Maintenance	0	0	0	0	3	1	0	0	0	0
Writing, Routing Msgs.	0	0	0	0	0	0	104	22	0	0
Setting Equipment	0	0	0	0	0	0	17	2	0	0
Regular Duty - unspecified	0	0	0	0	0	0	0	0	1	5
Check Lines	0	0	0	0	0	0	0	0	4	6
Care of Liberty Parties	0	0	0	0	0	0	0	0	4	8

Since more than one duty may be listed by an individual, the total number of responses may not correspond with the N for the group.

Note.—For a description of the method used in determining the percentages shown above, see Note 1, Table 33.

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Table 46

A List of Duties Performed on Import Watch and the Percentages of Time Spent by EMO's on Each Based Upon the Aggregate Time Spent on All the Duties Listed

(Job Questionnaire - Item No. 38)

Import Watch Duties	EMO	
	f*	N = 13 %
O.O.D.	6	37
Supervise Electronics	4	22
On Call	2	11
Non-electronics	1	10
None	3	6
Ship Security	1	5
Supervise Electrical	1	4
Quarterdeck Watch	2	3
Control of Ship's Boats	1	1
Render Honors to Officers	1	0.5

\* Since more than one duty may be listed by an individual, the total number of responses may not correspond with the N for the group.

Note.—For a description of the method used in determining the percentages shown above, see Note 1, Table 33.

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Table 47

Underway Watch Stations, the Frequencies and Percentages of Each Group Listing Them

(Job Questionnaire - Item No. 39)

Underway Watch Station	ET N=82 f %	SO N=116 f %	RD N=202 f %	RM N=112 f %	FC N=18 f %	EMO N=13 f %
ET Shop	52 63	0 0	0 0	0 0	0 0	0 0
CIC	5 6	2 2	0 0	0 0	0 0	7 54
Radar Transmitter Room	3 4	0 0	0 0	0 0	0 0	0 0
Radio Central	2 2	0 0	0 0	98 88	0 0	0 0
Engine Room	2 2	0 0	0 0	0 0	0 0	0 0
Sonar	0 0	100 86	0 0	0 0	0 0	0 0
J.O.O.D.	0 0	1 1	0 0	0 0	0 0	0 0
Master At Arms	0 0	1 1	0 0	0 0	1 6	0 0
Sonar Supervisor	0 0	1 1	0 0	0 0	0 0	0 0
Sonar Watch P.O.	0 0	1 1	0 0	0 0	0 0	0 0
Phones	0 0	1 1	0 0	0 0	0 0	0 0
CIC Operator	0 0	0 0	158 78	0 0	2 11	0 0
CIC Supervision	0 0	0 0	32 16	0 0	0 0	0 0
Bridge Look-out	0 0	0 0	1 0.5	0 0	0 0	0 0
Radio Supervision	0 0	0 0	0 0	7 6	0 0	0 0
Radio Messenger	0 0	0 0	0 0	4 4	0 0	0 0
Helmsman	0 0	0 0	0 0	0 0	1 6	0 0
FC Radar	0 0	0 0	0 0	0 0	3 17	0 0
OOD	0 0	0 0	0 0	0 0	0 0	3 23
Non-electronic	0 0	0 0	0 0	0 0	0 0	1 8
Unassigned	1 1	1 1	0 0	0 0	0 0	0 0
No Response	17 21	8 7	11 5	3 3	11 61	2 15

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Table 48

A List of Duties Performed on Underway Watch and the Percentages of Time Spent By the Group on Each Based Upon the Aggregate Time Spent on All the Underway Watch Duties Listed By a Group

(Job Questionnaire - Item No. 40)

Underway Watch Duties	ET N=82 f* %	SO N=116 f %	RD N=202 f %	RM N=112 f %	FC N=18 f %
Miscellaneous (Sweeping, etc.)	5 2	14 5	20 2	15 2	1 1
Equipment Maintenance	53 32	15 3	6 1	0 0	2 16
Supervision	5 1	11 5	39 13	30 17	0 0
Record and Log Keeping	25 10	27 4	51 5	7 1	0 0
Instruction and Training	10 4	7 2	9 1	13 3	0 0
Cleaning Spaces	9 2	5 1	0 0	32 4	0 0
Telephone Talker	0 0	12 5	96 11	0 0	1 3
Equipment Set-Up	13 4	0 0	0 0	27 3	0 0
Standby - on Call	26 28	36 17	0 0	0 0	0 0
Equipment Operation Check	22 12	0 0	0 0	0 0	2 7
Messenger	3 2	0 0	0 0	12 5	0 0
Equipment Operation	0 0	106 54	0 0	104 51	0 0
Petty Officer Duties	0 0	1 1	0 0	0 0	1 2
General Watches	0 0	3 2	0 0	0 0	1 13
Correct Publications	0 0	0 0	2 0.02	9 1	0 0
Spare Parts, Organ. & Upkeep	5 3	0 0	0 0	0 0	0 0
Tool and Equipt. Issue	3 0.5	0 0	0 0	0 0	0 0
Electrician Watch	3 1	0 0	0 0	0 0	0 0
Movie Operator	1 0.1	0 0	0 0	0 0	0 0
Bathythermograph Handling	0 0	9 1	0 0	0 0	0 0
Plotter	0 0	0 0	158 21	0 0	0 0
Radar Operator	0 0	0 0	165 33	0 0	0 0
Radio Operator	0 0	0 0	105 13	0 0	0 0
Air Controller	0 0	0 0	2 0.02	0 0	0 0
Assist CIC Officer	0 0	0 0	2 1	0 0	0 0
Evaluator	0 0	0 0	5 1	0 0	0 0
Preventive Maintenance	0 0	0 0	0 0	5 1	0 0
Write, Route, File Mags.	0 0	0 0	0 0	79 13	0 0
Tracking Targets	0 0	0 0	0 0	0 0	1 4
FC Radar Operator	0 0	0 0	0 0	0 0	3 30
Calibrate FC Radar	0 0	0 0	0 0	0 0	1 1
Helmsman	0 0	0 0	0 0	0 0	5 22

\* Since more than one duty may be listed by an individual, the total number of responses may not correspond with the N for the group.

Note.— For a description of the method used in determining the percentages shown above see Note 1, Table 33.

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Table 49

A List of Duties Performed on Underway Watch and the Percentages of Time Spent By EMO's on Each Based Upon the Aggregate Time Spent on All the Duties Listed

(Job Questionnaire - Item No. 40)

Underway Watch Duties	EMO N = 13	f*	%
CIC Watch		7	28
O.O.D.		4	18
Supervision		4	18
Evaluator		5	15
Non-electronic		2	12
Maneuvering		2	3
Plot DRT		1	2.5
Engineering Watch		1	2
Log Keeping		1	1

\* Since more than one duty may be listed by an officer, the total number of responses may not correspond with the N for the group.

Note.— For a description of the method used in determining the percentages shown above, see Note 1, Table 33.

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Table 50

Median Percentages of Time Spent By the Groups on Various Duties  
Out of Total Time Aboard Ship

(Job Questionnaire - Item No. 41)

Duties	ET N=82	SO N=116	RD N=202	RM N=112	FC N=18	EMO N=13
	f* Mdn%	f Mdn%	f Mdn%	f Mdn%	f Mdn%	f Mdn%
Preventive Maint.	80 13	78 7	118 5	72 8	18 12	4 0
Corrective Maint.	80 29	78 5	37 5	23 8	18 14	4 0
Record Keeping	80 9	78 6	142 9	59 11	18 6	4 0
Radar Operating	80 0	12 7	183 19	0 0	13 5	4 0
Sonar Operating	80 0	102 24	4 0	2 0	7 0	4 0
Radio Operating	80 0	5 0	125 12	95 42	7 0	4 0
Fire Control Operating	80 0	7 10	2 0	1 0	16 10	4 0
Talker	80 0	64 7	165 10	26 8	11 5	4 0
Plotter	80 0	19 5	173 11	1 0	8 1	4 0
Non-electronic Duties	80 10	85 16	109 14	39 12	13 12	6 0
Off-Duty Time	80 38	96 34	156 30	97 35	17 30	5 0

Indicates the number of individuals responding to each duty listed. The responses in the form of percentages were used to determine the median percentages for each group.

Note: No attempt was made to compute medians when the number of individuals responding was less than seven.

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Table 51

The Frequencies and Percentages of Each Group Listing Various Duties Considered to Be Most Important

(Job Questionnaire - Item No. 42)

Most Important Duty	ET N=82 f %	SO N=116 f %	RD N=202 f %	RM N=112 f %	FC N=18 f %	EMO N=13 f %
Supervising	1 1	4 3	16 8	12 11	1 5	4 31
Corrective Maint.	54 66	9 8	3 1	0 0	10 55	3 23
Equipment Operation	0 0	84 72	105 52	79 70	3 17	0 0
Standing Watch	0 0	8 7	15 7	1 0.9	0 0	1 8
Preventive Maint.	17 21	0 0	0 0	1 0.9	4 22	0 0
Record Keeping	2 2	0 0	3 0.5	1 0.9	0 0	0 0
Phone Talker	0 0	2 2	11 5	0 0	0 0	0 0
Cleaning	1 1	1 1	0 0	0 0	0 0	0 0
Instruction &	0 0	0 0	5 2	2 2	0 0	0 0
Training						
Spare Parts Upkeep	1 1	0 0	0 0	0 0	0 0	0 0
Military Duties	0 0	1 1	0 0	0 0	0 0	0 0
Non-electronic Duties	0 0	0 0	5 2	0 0	0 0	0 0
Chart Correction	0 0	0 0	2 0.9	0 0	0 0	0 0
Radio Communicator	0 0	0 0	6 3	0 0	0 0	0 0
Plotting	0 0	0 0	21 10	0 0	0 0	0 0
Handling Messages	0 0	0 0	0 0	5 4	0 0	0 0
Messenger	0 0	0 0	0 0	5 4	0 0	0 0
Mail Clerk	0 0	0 0	0 0	1 0.9	0 0	0 0
Engineering	0 0	0 0	0 0	0 0	0 0	1 8
No Response	6 7	7 6	12 6	5 4	0 0	4 31

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Table 52

The Frequencies and Percentages of Each Group Listing Various Duties Considered to Be Least Important

(Job Questionnaire - Item No. 43)

Least Important Duty	ET N=82	SU N=115	RD N=202	RM N=112	FC N=18	EMO N=13
	f %	f %	f %	f %	f %	f %
Non-electronic Duties	22 27	37 32	26 13.5	5 4	1 6	0 0
Standing Watch	5 6	7 6	7 3	1 1	3 17	0 0
Record & Log Keeping	17 21	11 9.5	27 13	13 12	3 17	0 0
Cleaning	2 2	10 9	37 18	33 29	1 6	0 0
Talker	1 1	11 9.5	32 16	3 3	3 17	0 0
Off Duty Time	2 2	3 2.5	12 6	2 2	1 6	0 0
Operating Equipment	5 6	3 2.5	7 3	0 0	2 11	0 0
Working Parties	2 2	1 1	1 0.5	6 5	0 0	0 0
Preventive Maint.	9 11	0 0	10 5	4 3	0 0	0 0
Plotter	1 1	1 1	8 4	0 0	0 0	0 0
Corrective Maint.	3 4	2 2	0 0	2 2	0 0	0 0
Miscellaneous (Laundry, etc.)	1 1	0 0	0 0	8 7	0 0	0 0
Special Sea Detail	1 1	0 0	0 0	1 1	2 11	0 0
Instruction & Training	0 0	0 0	1 0.5	1 1	0 0	1 8
Supervising	0 0	3 2.5	1 0.5	0 0	0 0	0 0
Ship Security	0 0	3 2.5	3 2	0 0	0 0	0 0
Messenger	0 0	0 0	2 1	0 0	0 0	0 0
Inventory	1 1	0 0	0 0	0 0	0 0	0 0
Shore Patrol	1 1	0 0	1 0.5	0 0	0 0	0 0
Division Officer	0 0	0 0	0 0	0 0	0 0	1 8
Housing Officer	0 0	0 0	0 0	0 0	0 0	1 8
Collateral Duties	0 0	0 0	0 0	0 0	0 0	1 8
Mess Treasurer	0 0	0 0	0 0	0 0	0 0	1 8
Coding Board	0 0	0 0	0 0	0 0	0 0	1 8
Movie Officer	0 0	0 0	0 0	0 0	0 0	1 8
CIC - Radar Operating	0 0	0 0	0 0	0 0	0 0	2 15
No Response	10 12	24 21	27 13	33 29	2 11	4 31

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Table 53

Types of Responsibilities to be Assumed Upon Promotion Expressed in Terms of Frequency of Response and By Percentage of the Group So Responding

(Job Questionnaire - Item No. 44)

Type of Responsibility	ET N=82 f	SO N=116 f	RD N=202 f	RM N=112 f	FC N=18 f
None	29 35	20 17	41 20	27 24	6 33
Supervisory	17 21	28 24	77 38	44 39	3 17
P.O. Duties	5 6	18 16	31 15	3 3	3 17
Operation of Equipment	1 1	1 1	7 3	17 15	0 0
Maintenance of Equipment	4 5	17 15	1 0.5	1 1	2 11
Training	1 1	8 7	2 1	0 0	0 0
Records and Logs	1 1	2 2	4 2	5 4	0 0
Leaving Service*	3 4	2 2	7 3	1 1	0 0
No Response	21 26	20 17	32 16	14 13	4 22

\* Tour of duty to be completed within a short time after completing the questionnaire and prior to any advancement in rate.

Table 54

The Frequencies of EMO's Listing New Responsibilities They Are Likely to Receive When Promoted  
(Job Questionnaire - Item No. 44)

New Responsibilities Expected Upon Promotion	EMO N=13 f
No Response	3
None	2
Executive Officer	2
Engineering Officer	2
Communications Officer	1
Division Head	1
O.O.D (underway)	1
Non-electronics	1

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--Note--

The diaries taken in the combat information centers are not included in this supplement. They are quite lengthy, and they include very little information bearing upon the electronic maintenance situation.

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The observers' diary notes are presented in this section in accordance with the philosophy of presenting all of the data derived from this investigation. Except for the fact that the diaries have been stripped of all identifying information they are presented virtually as written. As a result, they are not completely grammatical. However, it is felt that the presentation may highlight some of the procedures employed and the problems encountered by the ETs in the course of their shipboard activities.

The ships are identified by Roman numerals. The assignment of the numerals is random and does not correspond with the order in which the ships were visited. Each ET is referred to by a capital letter, the same letter is used with reference to a given man on a ship. The electronics materiel officer is referred to by title. The numbers in the left margin indicate the time of day that the notations were made.

TROUBLE-ORIENTED DIARY

Ship: I

Observer: D

- 0855 There is trouble with the MK26 fire control. A, FC/2 is there and also I, ET/SN. A says they don't know the trouble but it keeps burning out a tube at the base and the vibration of the ship makes the tube break away from the base. He said this has happened four times in the past month. If the set is left on operate the tubes will go out within eight hours. Also the presentation does not track on the scope.
- 0900 C, ET/C comes in and tells A to get paid. A leaves and the C gets an instruction book and begins studying through it. He reads various material as well as looking at circuit diagrams.
- 0914 C goes to the MOD-3 unit and looks at the presentation and turns various knobs.
- 0917 A returns - both play with the knobs.
- 0919 C goes back to instruction book. Studies schematic.
- 0923 C says check on V109. A opens unit. Pulls out V109 and at C's instruction he begins checking tube on tube tester.
- 0926 C checks over set, turning knobs and watching presentation. G, FC/SN is helping out testing tubes etc.
- 0928 Tubes test out okay. C puts them back in set. Closes set up part way. Turns it on and watches presentation. A and G are looking on.
- 0930 C is manipulating knobs and watching presentation.
- 0932 C opens set up and starts messing with the back of the scope.

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- 0933 C makes adjustments on scope and the presentation comes on correctly. G adjusts presentation.
- 0935 A takes over making adjustments influencing presentation.
- 0936 C says for them to see if they can pick up a target. A tells an FC/SN to go up in director and try to get on a ship. G turns out the lights. A adjusts presentation. He picks up a ship. He makes further knob adjustments. C jiggles set. This disrupts presentation.
- 0940 Turns lights on and opens set - C messes around with back of scope, watches presentation. Turns out lights again - adjusts presentation.
- 0942 Turns light on. C opens set and messes with back of scope. Wiggles back of scope as A watches presentation telling him what is happening.
- 0944 C pulls set clear open. Removes socket from back of set. He says it is a loose socket there. He tightens down parts of the socket with screwdriver, securing leads.
- 0946 C puts socket back in rear of scope. Closes up set part way. Turns on set. Has G turn off lights. A observes scope while C messes with the socket at back of scope.
- 0949 C makes screwdriver adjustments inside the set. A tells him the results of his adjustments.
- 0951 Closes up set. C says the trouble is probably in the scope. He figures the prongs are loose. He says he'll go see if he can find another tube. A asks if he wants him to check all the tubes in the set. C asks when the last time was. A figures not over 50 hours. G looks it up in his note book. Says he doesn't have it but it has been about 50 hours. C says not to bother with checking out the tubes.
- 0957 C leaves.
- 1015 C returns with new cathode ray tube. He turns off the power. He and A open set. They go to work removing back of tube. G goes to work taking the front plate off the front of scope. C and A stop what they are doing and hold the plate while G finishes loosening it.
- 1020 C and A work on removing scope. A removes tube and hands it to C. C hands it to G. C gets out the new tube. G puts old tube in box.
- 1022 C and A slip the new tube in and secure it and fasten the leads.
- 1026 They finish putting tube in. Find it isn't set in quite right. A loosens it again. Pulls it out and hands it to C. C is looking it over.
- 1031 He sets it down on the floor. Gets old tube - tests the tightness of the prongs on tube. The new tube is loose so has G go get another one.
- 1033 G returns with new tube. C takes it out of box - inspects it

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- and he and A slip it in place. A secures it while C holds it in place.
- 1036 Completes setting the tube in position. C puts the socket in place. Looks the scope over.
- 1038 C turns on the power. Observes the presentation on the scope. Makes adjustments of presentation.
- 1041 C tells G to put plate back over front of scope. All three of them are putting it back on and tightening it down.
- 1043 Still making adjustments of the presentation. These are all knob (front panel)adjustments.
- 1046 Opens set. C jiggling back of tube while A looks at presentation. A reports no effects from the jiggling.
- 1048 Closes up set. C and A observe scope. C grabs set and shakes it hard. Watches scope. No jiggling of presentation.
- 1050 C looking over stand that set sits on. Discusses ways of securing set so it won't shake so much when ship is traveling at high speeds.
- 1053 Still looking things over and discussing ways of reducing vibration. C tells A to keep set in standby and when the vibration becomes bad, to observe scope and see if anything happens. He says the cause of the tubes going bad is probably the vibrating and not that they are burning away at the base.
- 1057 C picks up the old tubes and leaves.

TROUBLE-ORIENTED DIARY

Ship: II

Observer: B

- 0900 E. ET/2 comes in and asks if anyone heard him key the TBL. Answer "No." E says "Well, I went aft and keyed it at the transmitter."
- 0901 K. ET/3 attempts to peak up TBL in radio central.
- 0902 K turns antenna inductance knob of TBL. It locks. He pulls side off the gear and works on it. Then he cuts it off the line.
- 0906 K uses force to twist Knob "K". He doesn't notify any other ET.
- 0907 K obtains shorting bar from bulkhead and shorts out TBL capacitors.
- 0910 G. ET/1 comes in and asks for H. ET/3. K asks him to take a look at the locked knob.
- 0911 G takes flashlight and makes visual check.
- 0912 G tells K to undo screws that hold the knob bracket in place. The screws turn out to be bolts with nuts on other side. This complicates the removal and they are dropping nuts and lock washers. Both K and G are working on the TBL
- 0917 K removes last of 4 bolts and lifts knob assembly out. G and K

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- examine the assembly. There appears to be some mechanical binding in the gear train. K takes it to workshop. G resumes work on SG-1B. K twists the stuck knob assembly then puts it on the bench and departs. The shack is very disorderly and he is having a great deal of trouble finding the things that he wants.
- 0922      K returns with light oil. The electronics materiel officer and H comes in with him. H takes the assembly and fools with it. He hypothesizes that the difficulty is the lock but discovers that this is not likely the case. He suggests that one of the retaining pins should be removed.
- 0942      K puts some oil on gears and it works fine. Apparently the gears hadn't been oiled for a long time.
- 0944      K returns to radio central with screwdriver and knob assembly for TBL.
- 0945      K puts knob assembly in place. This was not, however, the original trouble.
- 0950      K is having difficulty replacing the nuts and bolts which hold that knob assembly in place. He is just now tightening the first set.
- 1000      K still tightening the nuts and bolts which retain knob assembly. Has just tightened them all down. He is now replacing the coil connections behind the front panel.
- 1005      K still hooking up knob assembly.
- 1007      Closes doors and replaces sides. Starts to fire up the gear.
- 1017      Throws switch to "operate".
- 1018      K sits down.
- 1019      Call drill - Abandon ship. K leaves.
- 2302      SG is out again in CIC. G is checking it.
- 2305      G goes to transmitter room. Throws bulkhead switch for SG. Opens doors on driver unit. Checks fuses along left hand side of cabinet with multimeter.
- 2306      Unpacks new thyratron and compares it with one in the set by means of visual check. Uses shorting bar.
- 2309      Minute visual check of driver unit.
- 2310      Thinks that he has spotted another condenser which leaks oil.
- 2311      Opens instruction book to list of illustrations. Consults the corrective maintenance section of the list then turns to section 7 of book and leafs through schematics.
- 2315      Lays instruction book aside. Pulls tube from driver unit and inspects same. Lays tube on deck. Leaves for the tube locker.
- 2317      G returns with tube. Compares old and new tube visually.
- 2322      Says that that V107 was pretty well shot. Replaces V107.
- 2325      Lights off. Goes to CIC to check Range and Train unit. He says that he likes to let the tubes "cook in" for awhile before

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he fires up the gear.  
2335 Attempts to tune SG. It still won't radiate.

TROUBLE-ORIENTED DIARY

Ship: II

Observer: E

- 0805 In the transmitter room M. ET/SA is checking tubes.  
0807 He leaves to get more tubes. SG1b went out last night. So far, M says they tried replacing the magnetron. No luck. Now they are "Running through the circuits".  
0817 M returns with new tubes which he tests out.  
0820 Puts tested tube back in SG. Looks at circuit diagram.  
0823 Leafs through manual to part of the text.  
0824 Peers into SG-1b with flashlight.  
0825 Studies schematic again.  
0826 Goes to get a meter.  
0828 Returns, unplugs tube tester and reads manual.  
0829 Places meter before SG -- opens bottom doors. Seats self, adjusts meter. With flashlight he looks into SG. Then he turns to text in manual and its circuit diagram.  
0831 Gets readings from tube terminals of tubes he has replaced.  
0833 Looks at schematic. Checks to see that tubes are in. Tests some more, referring to text and schematic.  
0335 Closes bottom panel of SG and puts meter away. Goes to check with ET-1, G, who told him to make these tests and checks.  
0853 G pops in but M is not here. G leaves.  
0921 M can't find G.  
0925 M goes to transmitter room on hearing G is there. G asks how he came out. Then G goes over to SG.  
0930 G makes screwdriver adjustment at bottom while watching scope at top. Takes shield off scope first. Pulls out top drawer. Makes screwdriver adjustments in there. Twists switches while watching scope.  
0932 Removes shield from overhead dome light to get better access to top drawer. Taps tube with screwdriver. Taps other tubes while looking at scope.  
0935 Again removes shield from scope and adjusts screw at bottom. Bottom of scope has changed. Turns switch. Makes adjustments of switches in panel and screws in top drawer.  
0939 Closes top drawer. Gets out manual and looks at table of contents.  
0941 Leafs through text. Presses two buttons on the fourth panel from top. Back to table of contents in manual.

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- 0944 Electronics materiel officer pops in and asks G some questions. Then he leaves.
- 1000 Electronics materiel officer pops in for a book.
- 1003 G leafs through manual again.
- 1005 G talks to observer.
- 1021 Electronics materiel officer comes in and asks about progress. They have three triggers on set and only want one, at present. G looks around right side of SG where panel is off. Then pulls out top drawer, adjusts screws and taps tubes again.
- 1025 Closes drawer and adjusts screw at bottom. Twists dials on top drawer panel.
- 1027 Back to manual and to schematic.
- 1029 Pulls top drawer out again. Makes screwdriver and dial adjustments.
- 1031 Closes drawer. Leaves SG on and leaves the transmitter room.
- 1032 G comes back and makes adjustments on bottom screw. Adjusts dials looking at scope pattern. Adjusts screw in top drawer, and scope vertical centering knob. Adjusts screw at top left.
- 1036 Called to GQ.

**TROUBLE-ORIENTED DIARY**

Ship: III

Observer: D

- The AN/ARC has been giving trouble and the ET's have had difficulty fixing it. They finally decided to bring it back to the repair shack. M. ET/3 and H. ET/3 went forward to radio central and brought the set back to the repair shack.
- 0843 H takes casing off the set and puts set on working table. He then tests the power supply for voltage. It reads 6 volts. He opens the front of the power supply and rehooks some of the wiring so as to get a different voltage.
- 0848 H is still changing wiring for 28 volts. M goes forward to Xmtr room to get the necessary test equipment. Almost all test equipment is kept forward since the repair shack is in a very inconvenient place.
- 0851 H finishes rewiring power supply. He closes it back up and secures the nuts. He tests the voltage reading. It reads 28 volts.
- 0853 H gets an extension (or test) power cable, unravels it and plugs it into the AN/ARC. One line he ties to a frame and separates the loose wires. The other line he plugs into the power supply..

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- 0856 M returns with a receiver analyzer. H locates a mike. H turns on the receiver, then turns it off. An ET/SN asks for some Allen wrenches. H and M go to look for some.
- 0858  
0900 The striker really wanted a set of Phillips screwdrivers. They got him some.
- 0901 H starts looking through the instruction book. M standing watching.
- 0904 H still looking at and reading instruction book. He turns on the receiver. Adjusts it for a frequency. M says this job is as much for instruction as for repairing the set. This is a spare AN/ARC so they can take their time in repairing it.
- 0906 H turns off the set. Once again reading instruction book.
- 0910 Still looking at instruction book. All the tubes have previously been tested. They turn set up on its side and remove two tubes.
- 0913 H once again reads instruction book. M asks A to turn on set. H does so. H now looking at schematic diagram. H once again reading instruction book. M gets some head phones and plugs them in. H speaks in mike and M listens. H is reading instruction book.
- 0915 H has been reading section 5. Now is thumbing through section 6. Now looking through the table of contents. Is looking for the voltage checks. Gives book to M and asks him to find them.
- 0919 H gets the receiver analyzer and starts setting it up. M finds the diagram on voltage checks. H takes out the analyzer and sets it up.
- 0922 H turns set on side so can get at the test points.
- 0923 M says test 116. He says just take resistance checks.
- 0925 H turns on the set. Grounds one lead. Tests pin one. Tests pin 3. Tests 4. M is reading off the pins and the stated resistance and H tests the pin. Tests 5. All the pins are slightly lower than the value stated in the instructions. But in their opinion it is close enough. Tests 6.
- 0929 Pins 5 and 6 are not testing out right, the voltage is way too low. M says they have no high voltage and says that tells them something.
- 0932 Both are looking at schematic and tracing back the high voltage. Decide to test V102 and V103. H turns set back over. Both look again at schematic.
- 0933 Decide to test V104. H tests pin 5 on tube. Gets proper reading. H thought set had to be keyed to test it. M says no.
- 0936 Refers again to schematic. Decides to test V112. H removes tube and puts it back. M says high voltage is on pins 3 and 4. H tests pin 3 and pin 4. They were OK. Decides to test V-111 since it was a good output tube. M says high voltage is on pins 1 and 5. H turns on set, touches lead to pin and keys set while

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- reading meter. Gets 90 volts. M said that isn't bad.
- 0942 Goes back to receiver section. Decides to test V118. M looks up voltage check. Says pins 1 and 6 give high voltage. H turns on set and tests pins. The high voltage is very low.
- 0944 H turns off set and looks at schematic. Tracing back high voltage of tubes V116, 117 and 118. All from same source. M looking at wiring schematic.
- 0946 Both still looking at their schematics. J, an ET striker, has been here all this time. He has just been looking on but has done nothing.
- 0948 H says it was pin 8 from motor generator. There is a wire that has been spliced. H untapes it and cuts it leaving two loose ends. He gets flashlight and looks down in set at a relay. It is working.
- 0950 Decides to check high voltage again. Tests it and gets high voltage. So the trouble has been found. The trouble was that the guard channel was shorting out the high voltage and when they undid this spliced wire it cut out the guard channel and thus got high voltage to the other components. The guard channel is not needed so they are not going into it. Will turn it in to the yard when they go in next week.
- 0957 H is taping the two ends of the wire separately. He finishes and sticks wire up in the set. H turns on the set and is tuning it up.
- 1000 M secures the power cable and they both put the set back into its case. They leave the shack with the AN/ARC. They are taking it back to radio central. M tells J to secure the test equipments etc. that they were using.

TROUBLE-ORIENTED DIARY

Ship: III

Observer: F

- 0800 Call to radio central for H. ET/3. TCS in emergency radio is out. H goes to emergency radio. The electronics materiel officer and an enlisted man, who had smelled something burning are there. Still smells burnt. H goes to ET shack and gets fuse puller and meter. R. ET/3 returns with him. Back to emergency radio where H tests fuses while R opens the bottom receiver drawer of TCS.
- 0807 They inspect it visually. They find nothing. They unscrew fuses in power supply of TCS. Both primary fuses of power supply are blown, and are replaced.
- 0810 H leaves to get pliers.
- 0812 R leaves.

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- 0813 H returns with pliers and unscrews bolts of power supply.
- 0815 Top of power supply is red hot though it has been off for some time. H thinks transformer or rectifier or both are burned out. H wishes fuses had burned out more quickly.
- 0817 H tries to pull out the drawer which is the entire power supply. Finds it difficult.
- 0818 H visually inspects both upper and lower part.
- 0820 There is powder of salt spray around cables but no visible burns. R returns with instruction book from ET shack.
- 0822 R leaves for flashlight. H looks at schematic of power supply in instruction book.
- 0824 R returns.
- 0825 H feels the two transformers. One on left is much the hotter.
- 0827 They look for picture in instruction book to determine which transformer it is. It is T-101 and F101 and F102 blew.
- 0829 H pulls back entire drawer. He leans it back against opposite bulkhead. It won't pull all the way out.
- 0831 R holds instruction book. They go from the schematic to the gear and back tracing circuit.
- 0834 Electronics materiel officer enters and asks how they are doing. They are now tracing through a wiring diagram.
- 0836 Re-wiring was done differently from book. Jumpers were put in, shorting over-load relays. They explain this. Electronics materiel officer says he can't get by without them tomorrow. They hope the transformer didn't go before the fuse.
- 0840 Electronics materiel officer leaves. They have taken off jumpers and find that without them, the starting current kicks the overload relays.
- 0844 R looks in instruction book for regulator of overload relays.
- 0845 They start gear. It doesn't kick out. The output is normal. Apparently the transmitter didn't burn out. They had replaced the burned out fuses with spares carried on the front of the equipment when they first found them burnt.

TROUBLE-ORIENTED DIARY

Ship: III

Observer: D (Observations made at irregular intervals.)

- 1400 The TDQ located in radio central was giving difficulty. The crystal switch was thought to be giving the trouble by R. ET/2. There was sporadic cutting out in the set and he thought the switch was not making satisfactory contact. The top drawer was the unit where the trouble was. This drawer as well as the two lower drawers were stuck so R went back to the repair shack to get a screwdriver to pry them loose. He returned and

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with some difficulty got the three drawers loose. The components inside the drawers were very dusty so R took out all the drawers and dusted them off with a brush. The two lower drawers he replaced; the top one he left on the floor to work on. He turned it over so he could get at the switch. He manipulated the switch and observed the contact. He then attempted to take the switch apart by knocking out a pin that held it together. He was unsuccessful in his efforts, mainly because of inadequate tools. Unable to do this he removed the switch contact plate by using socket wrenches. He looked this plate over. Then, using a multimeter, he tested the switch circuit. He concluded that dirt was fouling up the switch. He thought the next step would be to clean the gear well. The electronics materiel officer came in and asked about the trouble and told R to get one of the other fellows to clean up the components.

The difficulty was in Channel 2. R came to the conclusion that the trouble was in the switch because replacing and interchanging the crystals did not affect the operation. The other channels operated properly.

(one day later) 1045 After cleaning up the switch and working with it further, R concluded that the difficulty was not here. He decided that if the trouble was not in the crystal or in the crystal switch then it must be between the crystal and the switch. He took the equipment down - removed the covers and removed the entire crystal unit. This required undoing a number of wires that were held by nut-tightened terminals and also some that required unsoldering the wires from the terminal. When he removed the crystal unit he discovered that one of the wires that lead from the crystal socket was broken at the socket. He then removed all the crystals and the crystal socket that was broken. He replaced this crystal socket and soldered the proper wire to it. He then replaced this unit in the set. Resecured all the wires. Put the covers back on, replaced the crystals, replaced the drawer in the chassis. He turned on the crystal current, then started the set. When the set had warmed up for about a minute he switched the keying switch with the crystal switch on channel one - he got a reading. He then switched the crystal switch to the other channels and still obtained no reading. He sat back from the set and talked a couple of minutes and keyed the set again; still no reading. He sat back and waited and talked more. He then spotted a vacuum tube lying on the floor. He said that it might help to have the tube in the set. He then unscrewed the drawer, uncoupled the antenna and pulled out the drawer. He unscrewed the top cover, put the tube in the socket, replaced the cover,

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1507

Closed the drawer, locked it, and recoupled the antenna. He then fired up the set again - waited a few seconds - and keyed the xmtr. Still no reading on the meter. He waited a minute and tried it again with the same results. He then laid down on the floor and talked and waited. A few minutes later he tried keying it again - still no meter reading. He repeated this procedure of waiting, then keying three more times with no favorable result. He then opened the crystal door and checked the crystals, they were OK. He then got the TDQ instruction book and started checking the corrective maintenance section. He then got up, uncoupled the antenna, loosened the drawer and pulled it out. He removed the cover and pulled out the tube he had replaced previously. He looked at it and said the trouble was in the filament circuit. He said it was most likely the tube. He had the ET striker who was watching him go after another tube. The striker returned with the tube and gave it to R. He put the tube in the socket, secured the set and coupled the antenna. He fired up the set - waited about a minute - keyed it and obtained a reading on the meter. He then tuned up the set on each channel as a final check on the set. He got good power output on all channels. The repair was complete. He then started instructing the ET on how to tune up the TDQ.

TROUBLE-ORIENTED DIARY

Ship: III

Observer: F

- 1045 Radio central - burning smell from power supply on TCS-12. K. ET/3 tries to pull out large drawer which is entire power supply. He can't. H. ET/3 enters and helps him; together they get it out. The transformer for the power supply which gave the trouble before, is red hot. Strong burnt smell. For some reason, the relays didn't go out.
- 1050 H glances around inside of supply. IC phone buzzes. K answers; T., the lead RM, calls that they need the TCS right away. H says they won't get it. M. ET/3 enters with meter and instruction book. K and M test fuses from front of power supply on a meter. All four are all right. H opens fuse box on wall above TCS. There are no insulated tools handy to get off fuses. H pulls them off by hand; they are OK.
- 1100 They close drawer and decide to start gear again and give it back to the radioman who wants it even though it may burn up. (They knew the overload relay hadn't tripped.) TCS starts OK. Phone from radio central says it is not going out too well. M

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- says he will tune it up if the people in combat will let him have it; combat controls it by remote control.
- 1105 M plugs in earphones and mike and starts to tune set sharper, going back and forth from the plate tuning knob to antenna loading knob. T sticks his head in and says not to keep it too long; they have contact with nearby submarine. Some other transmitter on this ship is putting out on the same frequency causing confusion. They had to switch to another transmitter in emergency radio. The other transmitter was a TCS being used on a somewhat different frequency. They have three TCS's aboard and use them simultaneously on different frequencies.
- 1112 Power supply is operating adequately for now and it is cooling off from its excess heat. This TCS is now being used by combat.

TROUBLE-ORIENTED DIARY

Ship: III

Observer: F

- 1925 The diary begins in radio central. The TDZ has been giving trouble all day, but they haven't had much chance to get it fixed. Sometimes it's had a weak power output and at other times it kicks out an overload relay when they try to tune it into a channel. Right now they have the bottom drawer of the TDZ out on the deck of radio central with test jacks to bring power out to it. The electronics materiel officer is taking a very active interest in the trouble shooting. He's leaning over the set and directing the ET's movements, trying to give them ideas on what could be wrong with it. Working on it are an ET/3, the only experienced man on the ship, considered to be the lead ET, and a new man who is an ET/2 but has just come from shore duty. R, the ET/2, is reaching for the instruction book for the TDZ which the electronics materiel officer is going through again. The TDZ is pretty important for the ship's communications because the ship lacks the TDE which most ships use to cover the same channels. They seem to feel that the trouble must be in the controls, and they are looking for a transformer called 1507, on the schematic.
- 1930 They are looking for the power supply transformer. No one here is especially familiar with the design of the TDZ. They are now trying to locate S104 which is the reset switch. It is felt to be the one that kept going out when they tried to get some power out of the transmitter. There is a radio operator busy taking code at the table.

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- 1935 A messenger has just come in with some radio information for the electronics materiel officer interrupting the tracing of the schematic. The other new technician, ET/3-K is now here. He is standing off on the side. The other ETs are going back and forth from the schematic to the parts, identifying some of the important parts. All three men are now thumbing through separate schematics in the instruction books trying to trace the workings of the gear. The electronics materiel officer is trying to figure out how the power gets through that overload relay, the one that keeps tripping. R says that if the overload goes out, power is lost to K109, shutting off the main power at the rectifier, at the primary transformer. This lower drawer of the TDZ which is out on the floor, seems to contain mainly the power supply but it also contains the telephone dial at the bottom of it. The electronics materiel officer wants to trace through the high voltage power supply. R has now removed the test jack. He and the third class have moved the bottom drawer back into the chassis and are closing it now. They are now taking out the second drawer from the bottom. The electronics materiel officer is going to check some voltages. The drawer is extended now. It is out from the chassis. Now they are lifting it out.
- 1955 The middle drawer is still out and R is fitting a jack around the right side of the unit above. The electronics materiel officer is keying the transmitter from the unit below. The electronics materiel officer and R are giving the gear a visual inspection as they key it, looking all around the gas tubes in the middle drawer. The electronics materiel officer wants to find a short that might be causing the trouble. He says that there must be a slight overload in the circuit. One of the gas tubes is faulty. R, after a lot of difficulty, manages to wiggle out one of the four gas tubes (one of the rectifier tubes). He is wiggling out the one toward the front of the gear. He has now replaced it with another tube of that kind. He is now watching its filament heat up. The electronics materiel officer is sitting on a chair, the instruction book in front of him. He and R are looking at the schematic of the entire gear again. The ET/3 isn't here just now. The ET/3 has just returned with another one of the gas tubes. They are now looking for terminal I of L102, which should be six hundred volts positive. They want to test it with the DCmeter. The electronics materiel officer said to the ET/3 that maybe they had better work in shifts - that he'd better catch some sleep until midnight. At which time he may be called if the gear isn't fixed. The skipper said no liberty for ET's until it is fixed.

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- R is now hooking up a DC voltmeter.
- 2008 They are now testing the voltage between ground and terminal I of L102, which should be six hundred volts. It doesn't have any voltage. Evidently the overload is out. They are going to key it. When they key it with the overload in they do have some voltage. In fact, the voltage is at six hundred which is normal while keying. They just corrected the reading and decided that it was three hundred, not six hundred. They now want to try the low voltage tap L104. The electronics materiel officer said the trouble must be in the three hundred, not six hundred. They now want to try the low voltage tap L104. The electronics materiel officer said the trouble must be in the three hundred volt circuit. The electronics materiel officer calculated how much missing current there was because of the lower voltage. It comes out to a loss of four hundred mills. They decided that the trouble probably is not in the power transformer. R thought it could be in the modulation transformer. The electronics materiel officer says that they better pull out the tubes, especially in the modulator circuit. The electronics materiel officer just had R take out the 6V6, or rather the 6MF7 in the modulator circuit. They want to see if the circuit still kicks off with those tubes removed, and it does. Whatever short or whatever is overloading the set is still in there even with those two tubes removed. M. ET/SN, has been in here for about ten or fifteen minutes standing on the side looking on. R just took out one more tube. He is helping the electronics materiel officer take out another. One of the tubes that they just took out was the V104. R is now taking out the V807 doubler. They are trying to test the screen voltage of the tube in the right side of this unit. It seems to have the proper voltage for it. R is going to the V102 testing pins, 5 and 2 to see if they have the proper voltage on them. The V102 seems all right, and he has moved on to the next tube. They are now over to the next tube, which is a 6V6. They are testing pin 3. They are not looking for voltage which is slightly off but, are looking for regular short. Looking for zero voltage here, from plate to ground or some other place.
- 2020 They got under the drawer and discovered that the fan blower shorted across the rectifier. They have straightened the blades of the blower motor so it's not across ground. Now the motor is a lot noisier. R noticed a large spark around the fan blade when he moved the drawer around a little bit. The bent fan blade was hitting ground, shorting out the rectifier. Unfortunately the gear still kicks out, even though the fan is now barely going. M and the radio operator are both standing off to the side watching these three people at work.
- 2030 Observer D takes over. R is just looking at the equipment.
- 2038 )
- 2100 )

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Now they are going to replace the choke L103. It is shorted internally some place. R is trying to figure out how to take the coil out of the set.

2154 R is still looking over the set; he's trying to figure out how to get it out. Now looks over the gear that he'd been working with. He's looking under the transmitter drawer now. He once again moves away the portable gear he's been using.

He uncouples the antenna. They are going to take out the drawer of the TDZ transmitter now. R and lead ET are pulling it out. They set it on the floor. The lead ET turns the equipment upon its side. He releases the power cable from the transmitter unit.

2157 R looks around various units, trying to figure out how to get the coil out. He says some of the screws there at the bottom of the drawer have to be removed. R has gotten a screwdriver and is loosening screws at the bottom of the drawer unit. He stops to talk with the lead ET. R is looking for a large screwdriver now. The lead ET is looking at the set and R is still looking thru the drawers here in the radio room for a large screwdriver. R finds a large screwdriver. He is once again attempting to loosen the screws at the bottom of the drawer. The lead ET holds the unit on its side while R loosens the screws.

2159 R is not having any success loosening the screws. He lays down the screwdriver. R holds the set. The lead ET leaves the shack, apparently to get another screwdriver. R is sitting on the floor now, sipping coffee and holding the set. The lead ET comes back with a large screwdriver. He gives it to R. R is once again attempting to loosen the screws. The lead ET is getting around the set so he can push against R's pressure. R is not having any success loosening the screws. They look and talk the situation over.

2201 R tries a screw further back on the set. He's not having success with that screw either. Lays the screwdriver down, and takes another sip of coffee. The lead ET arranges a seat for himself, and picks up a piece of test equipment. He is looking at the set now, looking around the coil unit. R is not doing anything, except holding up the set. R is now trying to loosen the screw at the bottom. He's not having any success with that one either. He has a very large screwdriver.

2202 The lead ET looks at an instruction book. He is looking at an external diagram of the set right now. He's thumbing thru the book. R is sitting on the floor holding the unit, doing nothing much of anything else. The lead ET is still looking thru the instruction book. While looking thru the book, he's joining in the conversation. The communications officer is present.

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- The lead radioman is present as well as two other radiomen, and observer F, R, and the lead ET. The lead ET is still looking in the instruction book. R is trying a different way of holding the screwdriver against the screw, and getting the radiomen to turn the screwdriver. Managed to get it loose by having the radioman use a wrench on the screwdriver and R pushing against the screwdriver. They loosen another screw in the same way. The lead ET has set down his instruction book and is helping to hold the transmitter unit.
- 2206 R is taking the screws out of the top part of the drawer. Now they reverse the drawer so that they can get the screws out of other side.
- 2207 R holds the screwdriver very tightly again while the lead radioman uses the wrench on the screwdriver. The lead ET is also applying pressure to the screwdriver. It didn't work that time so they are trying to get a better grip on it now. The radioman applies the wrench to the screwdriver, turning it. It does not hold so more pressure has to be applied to it. The lead ET is giving all the force he has. They loosen that screw and now go the other screw at the back of the unit. They loosen that one. Now the lead ET digs out the screws while R holds the unit up.
- 2208 They lay the unit down on the floor. The electronics materiel officer comes in and asks, "How're we doing?" Electronics materiel officer tells them to watch out for the fan under the set, "don't want to bust up a blade." They say if they bust it they can bend it back up. Then they say its not touching. They remove one of the screws. Now they pull up the entire unit there at the back of the set. They lay the power unit down on its side on the floor. The lead ET is sitting around, taking it easy. R works on the unit with a wrench. He removes the screws from the coil unit, that is, from underneath where they hold the unit into position. It's necessary to remove this unit so that they can get at the screws that hold the coil to the chassis. He removed another screw.
- 2210 He removed a third nut. He removed a fourth nut. Now he attempts to move the coil out. He raises it upward, at least outward, putting the set on its side so it's outward. The lead ET holds the replacement coil. R has a little difficulty removing the coil. He takes the large screwdriver from the lead ET, then lays the large screwdriver down and tries another size wrench. He removes some leads that go to the unit here on the side which extend over the coil and keep the coil from coming out. He removes another lead from this unit at the side. He has difficulty with the lower lead. Now he removes the coil unit and sets it on the floor.

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- 2212 R places the new coil into the unit. He sets the other coil into position. He puts the lead back on the other component of the unit. The lead ET is sitting back smoking. R has placed on the lower lead. Now he puts on the other lead. It's back into position now, and tightened down. He puts the ratchet on to a wrench. He gets the wrong size, puts it aside and gets another size.
- 2214 He tightens the other one down. He replaces nuts in the bottom of this unit and tightens the coil down. There are too many hands and too many fingers. He has difficulty getting the nuts on. The nut fell down under the set so he has to lift the unit and shake it in order to try to get the nut out. He gets it out. Now he puts or attempts to put on one of the nuts. He manages to get one on, and he works on another one.
- 2215 He is still attempting to get the other one on. Once again using the wrench, he puts the nut into the ratchet. He gets the wrong size. Now he gets the right size, puts it on the ratchet. He tries to fit the nut on to the bolt that extends down from the coil. The wires are jammed in pretty badly back there and it's hard to get the nut over the bolt. His fingers are too large, and the nut too small. Too many wires.
- 2217 He gets two nuts on now. He puts on another one. He puts on the third nut.
- 2218 He gets the fourth nut on. He tightens it down with the ratchet. He discontinues the task momentarily. He secures the nuts which secure the coil. R and lead ET now lift this unit up. They set it back down again. Now they set the unit upright on the floor and they try to secure the leads to the two outlets on the coil. They secure the leads.
- 2220 R has lost something. The lead ET locates it, it's a piece of wire. He secures the wire to a lead on the back coil with a pair of electricians pliers. Has a little difficulty securing the wire onto the terminal. He secures it somewhat. Now he brings it over to another coil and secures the other end of the wire to the terminal of the other coil. The wire is secured now to the two terminals. R takes the soldering iron and some solder, and solders one lead to one terminal of the coil that was replaced. He holds the soldering iron hard against the terminal.
- 2223 He clears away a lot of old solder on the terminal. He inspects the terminal. He now goes over to the other terminal of the coil and solders the other two leads to that terminal. He puts the solder on the place, and holds the iron against it. He puts on a little more solder. Removes his soldering iron from the terminal. Scrapes away the excess solder with the screwdriver. Applies the soldering iron a little bit. Removes the

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- soldering iron. Applies it again trying to scrape off a little of the excess solder. Now applies the soldering iron to the third terminal, that is the terminal of the other coil. Applies the solder, holding the iron against the terminal.
- 2225 He removes the soldering iron from the terminal. He looks the job over. Tests it by hitting the leads with the electricians pliers. They are satisfactory. He stands up and puts the soldering iron up on one of the frames that hold the radio equipment. R and lead ET lift the small unit. They turn it upside down and shake the solder off, by order of the electronics materiel officer. They replace the unit into its transmitter drawer. They try to fit it into position. It fits. They put the screws in, drawing the unit into place. The lead ET tightens the screws down with a large screwdriver. Moves the unit over a little bit because it didn't fit. Now he tightens it down.
- 2227 Tightens down another screw then lays the screwdriver down. R and lead ET lift the unit up on its side again. They put the screws back into the bottom of the drawer. They fit the end screw into its place, having a little difficulty in positioning the set properly for the screw to go in. Now once again they try to get the screw in. It goes in. Now tries to get another screw into the other position. He gets it in without any difficulty. He asks the lead ET for a large screwdriver. The lead ET hands it to him. He hands the lead ET the condenser which he puts back in. R secures the screws. Tightens one tight. Tightens the other one. Now R gets to his feet. They turn the set over on its other side now. Electronics materiel officer asks them to watch out for that fan blade in moving the set. They screw them in by the fingers, both working on a separate screw. R hands the lead ET the screwdriver and he secures the screw. Tightens it down securely, giving tremendous pressure to the screwdriver. When he releases the screwdriver immediately, R almost falls over the unit. He regains his position before the unit hits the floor. All the screws are tightened now, and both ET's are holding onto the set. R inspects the set. He disconnects the power cable. He pulls the power cable completely out of the unit. R and lead ET lift the drawer up. They finally let it go down again. They try to pull out the hinges. They ask for some help from the electronics materiel officer. He says, "Pull the nut on out and it'd probably be easier." The lead ET says, "No, you should just have them out slightly." All three of the men lift the unit, that is, the electronics materiel officer, the lead ET and R are trying to fit it onto the slides now.
- 2232 They fit it onto the slides. The lead ET tries to fit the drawer in. It won't go in. All three of them work on it to shove it in. The slides don't seem to be working correctly.

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- 2233 The lead ET and the electronics materiel officer change places, trying to work the unit in. The lead ET asks R to pull it out a little ways. R looks in back trying to see what's holding up the drawer. The electronics materiel officer says, "I think that's going to do it. Watch out for the drawer when you shove it in." Still trying to fit the slides by manipulating them.
- 2237 They get the drawer into the unit. R is attempting to tune up the transmitter. R adjusts the F dial and looks at the meter down at the lower part of the set. As yet he hasn't been successful in getting a good reading. This is the third tripler plate tuning knob. Now, he tunes on the I knob which is the power amplifier. He's holding down the test key. Now he's back to the F knob, turning it and reading it. He gets a peak reading there. Now he works on the G knob. Now on the H knob. Now he's on the J knob. He is holding down the test key all this time. Now he moves over to the K knob.
- 2240 He goes to the O knob. Then the L knob. The tuning meter reads zero. That is on the tuning indicator. Still turning the L knob, the tuning indicator now shows a reading of about 2. Now it drops down to zero. He is still tuning the L knob. The electronics materiel officer stands up and tries to adjust the receiver. R keys the circuit. The electronics materiel officer asks R to key it again. Now he asks him to turn it off. He drops a cigarette on R and tries to dust him off.
- 2242 R couples in a watt meter. He has difficulty getting the watt meter into the antenna terminal. The electronics materiel officer takes the watt meter from R. He takes the coupling lead off the watt meter. It is one of the little power output meters. Something is wrong with the coupling of the watt meter. Now they get another lead and couple it to the antenna output of the transmitter. Electronics materiel officer couples the lead to the power output meter. He finishes coupling this into the lead. R completes tightening down the coupling. The electronics materiel officer keys the transmitter.
- 2245 The electronics materiel officer tunes the J knob to the transmitter unit, putting the key down, reading the meter. The electronics materiel officer is still tuning the J knob while keying the transmitter. He had headphones on but he takes them off and sets them aside. He tries to fit the lead into the watt meter a little better. He keys the transmitter. He tests the coupling lead at the antenna output.
- 2246 He removes the lead from the watt meter. He looks at the coupling part of it. He slips a little unit down into it. Then pulls it out again. They are unable to make this power output meter work because the coupling unit of it is broken. They are not sure what the trouble is. The electronics materiel officer tells M that the watt meter has to be fixed because it is a very handy

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thing to have and should always be in operating condition. R keys the set. He adjusts the J knob. Now he adjusts the L knob, trying to get a maximum reading on the antenna indicator. He adjusts the K knob, then goes back to the J knob again. He keys the set, then releases the key. Now he keys the set again. With continual keying, the tuning indicator is reading about 2 and a half. The electronics materiel officer tunes the H knob, with R holding down the key. Now the electronics officer tunes the G knob. Now R turns the J knob, trying to get a maximum reading on the meter on the lower part of the set. This meter reads cathode current. Now R tunes the I knob. All this time he has been holding the tuning key down. Next he adjusts the selector switch down there for the cathode meter. He adjusts the L knob, then the I knob. The electronics materiel officer is handling the selector switch for the meter.

2249 R adjusts the J knob. Now he readjusts the J knob. The needle has gone straight up now. R adjusts the L knob, all of this time holding the tuning key down. Now he adjusts the K knob. The electronics materiel officer is up at the receiver unit adjusting various knobs. He is getting readings on the receiver while R is holding the key down on the transmitter. R talks into the mike. The electronics materiel officer says, "Nope, no signal." He says that the mike is shot and asks them to get another mike. R gets another mike with the help of the radioman. He comes back to the set and puts the new mike into the jack on the transmitter. Now he speaks into mike and the electronics materiel officer listening over the head phones says that it is loud and clear. R says he is going to go back and tune them all up now. The electronics materiel officer says, "Well, I'll call it quits." He hangs up the head phones on the TCS and he starts to leave the room. Then he comes back in. R attempts to tune up the transmitter. He adjusts the plate selector switches to various positions. He now tunes the D knob. Then he adjusts the cathode selector switch. Next he tunes the E knob for maximum. He puts the cathode selector switch in another position. Adjusts the F knob, reading the meter. Adjusts for minimum. Now he transfers to the G knob. Adjusts the G knob. He secures the D knob, locks the A knob, and locks the F knob. Then he locks the G knob. Now he adjusts the H knob some more.

2253 Now he is through adjusting the H knob, he locks the H knob. The electronics materiel officer says that he doesn't have to touch a couple of those knobs in tuning up the set. R tunes the L knob, reading the meter. The electronics materiel officer has just left the radio central. R leaves the L knob and moves to the J knob, tuning for maximum on the tuning

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indicator. Then he goes over to the K knob. Secures the I knob, locks the L knob, K knob, and J knob, then keys the set. He tests the set. He now removes the jack. He sits back from the set, just looking at it. The job is finished. Getting good reading, good output. Now it is a matter of straightening up the mess they have made in the radio central. R starts to pick up the test equipment on the floor and the leads and so forth.

2256 M is just sitting down. Then M begins to help him put things away.

MAN-ORIENTED DIARY

Ship: III

Observer: D

- 0830 Diary begins in ET shack with R. ET/2. No ET repair activity. Most of the ETs are working on the spare parts inventory. R is finishing filling out his forms. The shack is quite crowded with all the ETs in it. The spare parts boxes are all over the place. The ETs have been working on them putting them in the bins all this week to try to get them in order before going into the yards next Monday.
- 0850 R still doing nothing productive.
- 0920 R not doing anything. Is waiting for the projectionist to bring down the movie projector that went on the fritz Tuesday evening. The projectionist and electricians have been working on it but have been unable to find the trouble so are turning it over to the ETs.
- 0935 R begins an inventory of all the tools they have. He starts going over the screwdrivers. Decides to get all the tools together. Goes forward to the transmitter room to bring back all the tools up forward.
- 0943 R returns with his arms full of tools and test equipments. He puts the things away in their appropriate drawers. He goes through all the drawers and sorts out all the screwdrivers.
- 0947 He's looking over all the screwdrivers and counting them. Writing each tool's name, number, and description on a plain sheet of paper.
- 0956 Completes inventory of screwdrivers. Takes one last check around the shop to make sure he has them all. Finds one more. Have more than a sufficient number of large screwdrivers (8). The smaller ones are less numerous.
- 1000 Begins inventory of Phillip's screwdrivers. Has five different sizes.
- 1002 Completes this. Begins inventory of spin-drive wrenches. Has ten sizes.

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- 1008 Completes this inventory. Begins inventory on a socket wrench set.
- 1010 Has fire drill. The fire is in engineer's wardroom. R goes to his battle station. Goes to radio central. Gets an easy chair and a cup of coffee and talks.
- 1023 Secures from fire drill. Returns to repair shack. Continues inventory on socket wrench set.)
- 1036 Completes inventory on this set.
- 1037 Ship's speaker calls for the duty ET to report to emergency radio. R goes to emergency radio. M, ET/3 and K, ET/3 are there.
- 1040 Returns to repair shack. R looks through other tools.
- 1045 R leaves. He had to see the dispersing clerk about some personal business.

MAN-ORIENTED DIARY

Ship: III

Observer: F

- 0845 M. ET/3 is sitting in ET shack at a table. In front of him is a file of spare parts; each has a separate card. As H ET/3 standing to left of M, reads off the parts from their old list of parts (all in one book) M checks them on the separate cards; they are converting to a new system.)
- 0900 M and H exchange places and roles. M converses now and then with J. ET striker (also in ET shack), leans over H's shoulder now and then, and goes back to the book reading serial numbers of parts aloud.
- 0930 M converses with observer; says about a fourth of time under way is taken up with paper work, inventory, records and requisitions.
- 0940 M reads more part numbers aloud - now to K. ET/3 who has relieved H.
- 0950 M coming to another group of parts on list, H reaches into spare parts bin, right across from the table and extracts these parts. He lays them on the table and reads off their numbers to K.
- 1000 After K has recorded the numbers, M places them in drawer on table which has the new number arrangement on it.
- 1002 Break for coffee; M and K go to radio central. No coffee there. Go down to CIC. No coffee there either. M jokes around a while.
- 1010 Fire drill. M goes to his station (same as for GQ) at the range and train control unit in main director. He puts on head phones but is reminded not to turn on gear for fire drill. All power off during fire drills.

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- 1020 Order to secure fire drill. Leaves director.  
1025 As M is returning to ET shack, muster is called for section 2 of fire and rescue groups of which he is a member. He musters with an electronics group of about a dozen on the deck at midships. A RD/2 takes the muster. This is the first time for M; he has only been in this group a few days. Before this, they didn't have fire and rescue sections on this ship.  
1035 While muster is still on, the word is broadcast for duty ET to go to emergency radio. M leaves and enters emergency radio. K and R enter soon afterward. A teleman tells M that he smelled smoke. The smell comes from TCS - power supply, where trouble was before. M can't open panel. K gets pliers and M opens bolts.  
1045 M leaves for instruction book and meters.

TROUBLE-ORIENTED DIARY

Ship: V

Observer: D

- 1940 J. ET/3 comes to wardroom, looking for electronics materiel officer. Finds him. He tells J that the radarmen were having trouble with the SL when the ship was coming in today. They had told the electronics materiel officer that the 2 mile range was not working in that the target would not move out on the PPI when the range was switched from the four miles to the two mile. Also, the range bug was acting up. It would jump in and out forming large pips as the bug traveled around the scope. The CIC is secured for the evening and locked so the electronics materiel officer gives J the keys and tells him to go up and see if he can locate the trouble. He tells J he will be up later and if there is any trouble or if he completes the job to notify him.  
1945 J leaves for CIC. The SL is running so he turns on the scope and observes it. He switches to various ranges and turns the range crank but can't observe anything wrong. When he switches from the four to 2 mile range the bug moves out. He makes a slight screwdriver adjustment of the 2 mile range marker adjustment. He adjusts these switches over and over again. At the same time he is changing the receiver gain and turning the range crank. He finally concludes that nothing is wrong with the set.  
1955 He secures the scope and he leaves - locking CIC. He goes down to the wardroom and tells the electronics materiel officer that he can see nothing wrong with the scope. The electronics materiel officer questions him about it. He asks J if the targets moved in and out as the 2 and 4 mile ranges were

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changed. J says he isn't sure about the targets but the range bug changed as the ranges were changed. J argues that if the bug changes the target would also have changed. The electronics materiel officer isn't so sure about this. J says he will go back up and check the targets. The electronics materiel officer asks him if the large pips showed up. J says he was unable to observe them. The electronics materiel officer decides to go back up with J. (Previously when J came in the first time the electronics materiel officer told him that he thought it must be a bad tube in the range marker circuit. This opinion he based upon the symptoms present in the set,) J and the electronics materiel officer go up to CIC. J turns on the scope. The electronics materiel officer observes the scope, he then starts changing the range switches between the 2 and 4 mile range. He observes the targets moving in and out as the range is changed. He says that there is no trouble there anymore if there ever was. He then changes the range switches between the various ranges. He calls J's attention to the fact that there are small pips made by the bug as it moves around the scope. He says they were much larger than that this afternoon.

2002 They both adjust the switches observing the scope and the pips made by the bug. The electronics materiel officer says that because of this he thinks it is probably one of the tubes. He says it's probably due to a tube being gassy. J says it could also be a leaky condenser. The electronics materiel officer thinks a minute and then agrees with him. He says the thing to do is to get some tubes and check the ones in the range marker circuit by replacing them. He says this frequently has to be done because it is the fastest way to get the set back on the air. He says Navy equipment is quite sensitive so the tubes must be in top running condition in order for the set to work properly. He says they throw away tubes like garbage but you just can't operate on a poor functioning tube as you can in civilian radio sets. He asks J where the range marker unit is located. J informs him that it is in the unit at the side of the main frame of the indicator. (J had previously said it was most likely in the range marker circuit since it was the bug that was acting up. The electronics materiel officer agreed with him.) The electronics materiel officer asks J if he knows the tubes of the range marker circuit. J says he doesn't but will get the manual.

2007 J goes down to radio central and brings back the SL manual. He opens the manual to the block diagram of the SL indicator. He and the electronics materiel officer study it over. They find the range marker circuit and study it. The electronics materiel officer says "let's look at the schematic of the

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- circuit". J says that it won't show anything more but he turns to the schematic.
- 2012 They study the schematic for awhile. J goes over to the indicator unit and pulls out the drawer of the range unit. The electronics materiel officer comes over and they both look at it and discuss the tubes. They go back to the schematic.
- 2015 They are looking at the schematic of range marker circuit. Turn off lights. Go to indicator unit. Play with range marker some more. J taps the various tubes while the electronics materiel officer watches the scope. No effects are noticed on scope. The electronics materiel officer says that it must be a leaky condenser.
- 2020 Goes back to schematic. Tries tracing through the circuit to determine what can be the trouble. The electronics materiel officer tells J he can't help him much. He leaves, telling J to notify him on what he does.
- 2024 J traces through schematic and block diagram. Leaves to get multimeter from radio central.
- 2025 Returns with multimeter. Sets it up by range unit drawer.
- 2027 Starts testing points. Gets up. Puts shield over scope and taps on tube with a flash light while observing scope.
- 2028 Raises up top on indicator unit. Makes screwdriver adjustments while observing scope. Says that he is not convinced it's anything more than out of adjustment. He adjusts the variable range adjustment and the 2 mile range adjustment so that they synchronize.
- 2031 Observes scope and manipulates range switches. Unable to see any more pips.
- 2033 Lead radarman comes in. J asks lead RD if he can see what he saw that afternoon. RD says he can't.
- 2035 RD leaves. J raises top of indicator. He makes further adjustments of the variable and 2 mile screwdriver adjustments on the range marks.
- 2038 Puts drawer back in and secures it. Goes down to get electronics materiel officer to check it out.
- 2040 Returns with electronics materiel officer. They both manipulate various switches while observing the scope.
- 2043 Both are standing over scope. The electronics materiel officer says "good boy". He feels that the set has been adequately corrected.
- 2044 J making adjustments. He's trying to explain to the electronics materiel officer why this adjustment does the trick. J says that the 2 mile marker can not synchronize with the 4 mile.
- 2045 They look at schematic as J explains it. J's head is bothering him so the electronics materiel officer tells him to knock off and go get some rest. They both start securing the set.
- 2047 The set's secured. They both observe scope and manipulate

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2050 range switches and range crank some more.  
The electronics materiel officer leaves.

TROUBLE-ORIENTED DIARY

Ship: V

Observer: F

- 1905 Trouble with SC, M, ET/2; T, ET/3; and R, ET/SN go to CIC and discuss trouble with operator. True bearing indicator is 180 degrees out of phase. Should point to 270 degrees (actual course) but points to about 100 degrees. Operator leaves.
- 1920 R says someone had said this is old trouble which an ET tried unsuccessfully to repair a month ago, it is but rarely used so it is unimportant. T had checked up on synchro motors in ET shack when he heard of trouble. He had remembered that if leads R1 and R2 are reversed the synchro will follow 180 degrees out of phase. Looks at these leads and sees that one looks stretched and the other jammed. He wants to reverse them.
- 1925 D, a radarman, enters and argues as to what the symptoms are. Center dial of gyro compass repeater is what is off. Reads 110 degrees when red line is at top rather than 270 degrees which is actual ship's course.
- 1930 T turns off gear and flicks antenna control switch from true to relative; this should turn off gyro. He reaches in with screw driver to switch leads. There is big spark. The gyro input is still there. The assistant CIC officer drops by to ask how they are doing.
- 1937 T and M go over lead connections in schematic of instruction book and try to trace what exchanges of leads would do.
- 1940 Decide gyro input would have to be turned off down in plot to get rid of voltage in gear. Can't exchange leads until gyro voltage is off and this might shut down other gear. When the ship is in port, they will exchange the leads and probably fix it. T closes the cabinet of the indicator unit and yells to the assistant CIC officer that they will fix it in port.

TROUBLE-ORIENTED DIARY

Ship: V

Observer: G

- 0855 J, ET/3 called at ET shack. The VD on open bridge is out.  
0900 Goes to open bridge. Takes off front panel. Pulls out drawer.  
0903 Turns selector switch under bridge deck. Adjusts focus and range markers. Varies range selector and center expand

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- switches. Tells talker to have man below bring up some gear. Has multimeter, screwdriver, long-nose pliers, and test leads brought up. The VD has no sweep.
- 0904 Tells talker to have someone turn something on rotor and leave it for a minute. Looks at circuit diagram in manual. (Navy model VD-2)
- 0905 Traces circuit.
- 0906 Goes to CIC to check if SA is on. It is off. Turns it on. Repeater then works O.K. (Trouble was no sweep on surface search and no rotation on air search). Has talker tell CIC to adjust range to 20 miles.
- 0907 Checks on repeater's performance. Adjusts intensity. Has it changed to the mile range. Readjusts selector switch for surface and air search.
- 0910 Looks at circuit diagram again. Now has no sweep on surface search but air search is OK.
- 0913 Looks at manual.
- 0914 Adjusts selector switch. Looks at scope. Adjusts range selector. Pulls drawer out and looks in. Looks at manual - and at descriptive diagram. Says he hopes set has interlocks. The drawer is in. Talks to electronics materiel officer who's on watch on the bridge. Fastens drawer down.
- 0918 Adjusts selector. Goes to CIC. Uses flashlight - pulls out a drawer of SL and looks at set. Loosens and pulls switch, holding flashlight as he turns it.
- 0920 Checks with multimeter.
- 0921 Having trouble with true bearing on a repeater now. Adjusts - sets it by hand. (SL)
- 0925 Still setting up true bearing.
- 0928 Bearing is set up.
- 0930 Leaves CIC - J going to get paid and get a cup of coffee - He says that the job can wait. He thinks the trouble is the selector switch since some tubes and the synchro give sweep for air and surface search but there is sweep on air but not on surface. Therefore, the trouble must be the selector switch or back of that.
- 0944 J comes back. Goes to the 2nd deck. Stands in open place to read and trace circuits. Reading SL manual.
- 0949 Goes to radio central for tube.
- 0953 Goes to CIC. Pulls out SL drawer. Looks with flashlight. He prods the tubes. Has decided switch is OK but the current to it is out. He pulls a tube.
- 0955 Looks at manual. Tube socket isn't marked. Touches a tube and gets a rough shock.
- 0958 Goes to repair shack for tube.
- 1000 Goes back to CIC. Puts tube in SL.
- 1002 Goes to bridge.

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- Turns selector switches. Looks at scope, adjusts it and finds it's OK. Repair complete.  
1005 Puts SL drawer back and fastens it down.  
1007 Takes manual back to radio central.

TROUBLE-ORIENTED DIARY

Ship: VI

Observer: F

- There is no output on the high frequency band of the TBL. The communications officer had told T. ET/3 that it had to be running by early in morning. The master oscillator plate current reads all right but the next stage, the first amplifier, has zero grid and plate current. T has replaced both the master oscillator tube and the 1st amplifier tube, but the symptoms remain.
- 2300 T goes between bulkhead and gear and looks through side panel as he reaches around and turns transfer switch. The switch, S4, seems to be making contact on the high frequency as well as the intermediate frequency side.
- 2307 T goes to ET shack for a meter.
- 2310 Returns and turns off gear completely. Also brings back light bulb and extension cord.
- 2312 Plugs in extension cord, leaving bulb on floor in front of gear. Puts meter on ohms X 100 scale.
- 2315 Opens door and removes high frequency oscillator tube. Flashes light around empty socket. Also flashes light through open door of first amplifier.
- 2318 Removes first intermediate frequency amplifier tube and flashes light around that section. T is looking for a place to test the continuity from coupling capacitor C18 to grid of 1st amplifier and back to the plate of the master oscillator.
- 2326 T opens the lower side of panel.
- 2328 Unscrews felt-covered wall of oven which contains the master oscillator tank.
- 2332 Looks around inside with help of light, especially around high frequency tank. Can't find C18 on this side though it had looked from the outside that it must be in here.
- 2337 Removes lower back panel. Finds C18 around center of back of gear in with the parts of the grid of first amplifier. It is behind a coil and tuning capacitor - very hard to get at.
- 2345 Turns knob of HF doubler circuit tuning so he can inspect the moveable parts of the grid tank. There is some salt on the plates of the capacitor.
- 2349 Brings meter around to back and measures ohms. Measures across L4 - reads 5000 ohms - O.K. Measures across C15, - first coupling capacitor. It reads open. T says a good capa-

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- capacitor would make the needle jump and return to zero when you reverse your leads.
- 2400 Checks size of C15 in instruction book. C 15 has a .01 of capacity - this size should make meter jump, but doesn't. T decides to check it again and take it out if there is still no reading.
- 2405 Capacitor still checks bad. T looks at the schematic of the circuits. One side of C15 leads to B plus. He would like to find some way to isolate the capacitor.
- 2409 Goes to front of gear and flashes light around tubes of first and second amplifiers. Flashes light around back and returns to front. Complains of how hard it is to see back in there in order to follow connections.
- 2415 Replaces the 3 tubes that were out. He wants to fire up gear and see if it might work. Tries to scrape some salt and specks off variable capacitor C17 and rattles it around.
- 2420 Fires up gear. It doesn't work. Plate voltage on meter doesn't drop, as it should, when gear is keyed. It's the same as before.
- 2425 Turns off gear and returns to back of it. Checks against schematic there.
- 2430 Finds a short across L4 now - as it should be. Goes to C17. Reads a virtual short as it should (in parallel with L5).
- 2435 Crawls out from in back and stretches.
- 2440 Turns on gear again and goes to get alligator clips to measure voltage.
- 2445 Plugs in meter and prepares to take DC volt readings on the 1000 volt scale. Clips one lead to ground. Turns off gear and clips the other lead to the plate cap. Reads about 1000V on plate of the master oscillator - same as meter in gear reads.
- 2450 Looks at instruction book. Wants to check through voltages at all elements so goes to screen grid of the master oscillator.
- 2455 Hooks up meter and starts gear. The screen grid of the master oscillator tube reads 1000V. It should only read about 500V.
- 0100 Measures voltage across R6 and finds zero resistance. Removes R6 and measures its resistance. 50,000 ohms as it should be - plugs it back in.
- 0110 Looks at master oscillator tube. It seems all right. Measures voltage from screen grid to ground; it is 1000V with tube out. With tube in the screen grid voltage is much too high.
- 0120 T says he wants to try something he just thought of. He leaves radio central.
- 0124 Returns with crocus cloth. Remembers how contacts gave trouble in past and cleans the high frequency master oscillator range switch; successive contacts cut out more and more inductance and increase the frequency. So it was simply dirty contacts in the switch that kept the master oscillator from

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oscillating. The TBL works fine now. Apparently the high screen grid voltage came from the lack of oscillations. T had suddenly remembered that once before it had been difficult to find trouble that seemed to be in the circuit that turned out to be dirty contacts.

- 0135 T checks meter readings. They are all normal. He replaces side panels. T says they did this before - about a year ago. He has no idea what made him think of it now except that in both cases they worked on those circuits for some time.
- 0150 All the panels are on. T tries it for a last check and now it does not work at all. Same symptoms as before: fairly normal master oscillator screen and plate current and no current at all in other stages. T works the high frequency master oscillator range switch for awhile then he removes the side panels again.
- 0155 He rubs the switch contacts again. Also cleans the wiper this time.
- 0200 It works fine again. M.O. plate and grid currents read about like before. Other stages also normal.
- 0220 Puts side panels on. Tunes up the gear.

TROUBLE-ORIENTED DIARY

Ship: VIII

Observer: B

- On the SU surface search radar. Location - CIC and transmitter shack. ETs involved - B ET/3 and K ET/SN.
- 0920 B is working on Mod Gen section of SU. He explains that the driver is operating below par. Should have 12 and 6 mils on the modulator and magnetron current respectively but has something like 8 and 4. K comes in and reports that they have no 715B in stock. They kneel before equipment and fire it up. Then turn it off. B says that he has just returned from a one week school on the SU where they had gone into the circuitry very carefully. The captain has set a one hour deadline for the repair. They have replaced a 719A.
- 0935 B lights off SU and attempts to tune it in. He says that the scope symptoms for the weak output were, 1)weak returns, 2)limited range. Replacement of 719A improved performance. They have replaced most of the tubes in the transmitter.
- 0940 B sits down and reads from instruction book. K is looking at transmitter. Now goes and stands by B.
- 0943 B checks power supply schematic. Then checks transmitter receiver - schematic.
- 0944 B and K check schematic.
- 0945 K goes out to get 1B24, Mod. tube and 4-72, rectifier tubes.

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- They plan to check power supply by tube replacement.
- 0947 B goes to radio central and adjoining room which houses many of the radio receivers and component units of the SA and SU.
- 0948 B goes below to get meters. He is going to try to improve the performance by improving the sensitivity of the receiver.
- 0951 B has not yet returned.
- 0953 B returns with multimeter. Sets it down and lifts shield cover from the receiver RF and IF strip. He sets about measuring the DC voltage and checks crystal current. Crystal current and AFC current are abnormally low. Tells me that he is going to replace the TR tube in the receiver.
- 0957 K comes in with T/R tube. Gives it to B. B tells him to go up and turn the echo box on. K leaves.
- 0958 B reads from section V of the instruction book.
- 0959 Sound power phone rings. B answers. K reports that he can't get echo box to tune in. B tells him to turn the IFF off and then he will be able to get a better one. Hangs up.
- 1000 Phone rings. B answers. Tells K to come on down here. B goes back to instruction book.
- 1002 K comes in. Goes to B and reports that they seem to be getting an erratic pulse up there.
- 1004 B explains to K what he thinks they should do.
- 1005 B uses screwdriver to dismount T/R tube. K assists him by holding leads out of the way and in general being an extra hand.
- 1006 Replaces T/R tube with new tube. B unwraps and inspects tube and hands it to K who puts it in place and carefully positions it. K uses screwdriver to tighten retaining screws. B stands by.
- 1010 B reads instruction book while K continues the tube substitution. B is reading about the T/R tube in section VI of the manual.
- 1011 K finishes and tells B.
- 1012 B prepares to use meter to check crystal current. Tells K to throw gear in standby because time-delay is not in working order.
- 1015 B checks via phone to see if gear in CIC is on standby. It is, so he lights off the receiver and checks crystal current with multimeter.
- 1016 B calls K and tells him to put the set in "operate".
- 1017 B moves probe to check AFC. Current in each is still very low.
- 1018 B obtains instruction book and consults table of contents. He turns to page 3-2 and consults the "Regular Tuning Procedure".
- 1020 B phones K and instructs him as to what he should do.
- 1021 K comes in. He and B talk at length, planning to coordinate their activities in order to properly peak up the gear.
- 1024 K leaves. B waits.
- 1026 B leaves.

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- 1027 B returns. Answers phone. Then hangs up. Then calls back to K. B holds phone in left hand to left ear and uses screwdriver in right hand to adjust screwdriver adjust for T-R box. This determines when it will fire. Tells K to secure gear and replace crystal mixer.
- 1030 K comes in. Said, "All that it seems to do up there is to cut it down a little bit." B says, "Well, it increases the crystal current here."
- 1032 K goes out. B takes a spare crystal for the crystal mixer from a package and checks front to back ratio with the multimeter. He is not sure what it should check. He is going to compare it with a new one that K is getting.
- 1038 K returns. He can't find the suitable crystal. He is looking for a IN23B. B says that they are in the after tube locker. B reads the instruction book.
- 1045 B phones. Hangs up.
- 1046 Phone rings. B answers then hangs up. It was bridge wanting to know how long.
- 1047 B replaces original crystal.
- 1048 K returns with crystal. Says that he had also found a 715B. Goes to CIC.
- 1049 B calls K and tells him to put gear on standby. Hangs up.
- 1050 B looks through instruction book. Stops and reads a section on power circuits, then rereads tuning instruction. He is currently planning to follow the trouble shooting guide for the condition where neither signals nor grass appears on scope. Actually he gets some close-in signals but no grass.
- 1057 Phone rings. B answers "okay." Then inserts test probe. He talks to K. Tells him to set local oscillator tuning to mid-position. Mixer crystal current is about .25 mil, it should be .50 mil.
- 1100 B still holding phone and listening for K. He finally brings the buzzer. Hangs up phone and leaves.
- 1102 B returns. Goes to phone says, "okay" and follows instruction book while K tells him.
- 1108 B checks AFC current. Asks K for modulator and magnetron current.
- 1109 B tells K that they have practically no AFC current.
- 1112 B hangs up phone and goes out. Returns at once with an insulated screwdriver. Makes several adjustments on cavity of the local oscillator while watching meter. He puts screwdriver aside and consults instruction book. Puts book aside and looks at the receiver. Then calls K. Then hangs up. Returns to the receiver and continues to tune for .5 mils crystal current.
- 1122 K calls. B tells him the local oscillator voltage is very low. Suggests K come down to this room and then hangs up.
- 1124 K comes in, B gives him instructions to vary some control and

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- 1126      B will watch to see effect on local oscillator voltage. K leaves.  
B is watching meter and tuning cavity of local oscillator.  
Calls K. Tells him that there is no change in local oscillator voltage.
- 1135      Observer D takes over diary. Studies circuit diagram. Looking at various circuit diagrams.
- 1137      B picks up instruction book and multimeter and leaves for CIC.
- 1142      B returns with multimeter and instruction book. Sets up multimeter.
- 1143      Calls K and tells him to vary the control slightly and he'll see if he can bring the voltage up. B puts probes of multimeter on test points in receiver. Adjusts crystal set while reading meter.
- 1146      Adjusting some unit down in receiver with screwdriver while observing meter. Adjusting local oscillator with fingers.
- 1149      Back to adjusting with screwdriver.
- 1150      Calls K. Asks him to put set in AFC.
- 1151      Returns to set. Changes test probe. Adjusts local oscillator with fingers.
- 1153      Returns to making an adjustment with the screwdriver.
- 1154      Changes test probe to another location. Makes finger adjustment. Then a screwdriver adjustment while observing meter.  
Calls K. Asks him what the voltage is now.
- 1155      Talks further with K. Says he has some fixes on the scope.
- 1157      K calls. B screwdriver tunes the TR box while observing meter and talking with K. Asks K how many yards he has.
- 1200      Tunes more on TR box. Still talking with K and observing meter.
- 1201      Leaves for lunch.
- 1400      In CIC, B is sitting in front of SU transmitter. They are going to replace 715B. K comes in and brings new 715B. He joins B on floor.
- 1402      B carefully pulls out 715B and replaces it with a new one.
- 1404      Turns set on. Arcing reflected in plastic cover. B checks. The high voltage wasn't turned off.
- 1406      Replaces 715B. No change. They leave it in to "cook in".
- 1413      Attempts to tune front panel.
- 1417      No targets. It seems that it is going out but not coming back in.
- 1419      B goes out. K pushes indicator unit back into place and secures screws.
- 1422      B calls in. Is below attempting to line up receivers.
- 1423      K talks to B on phone. K reports that they are finally getting along. They have traced the voltage to the receiver.
- 1427      K talking to B on phone. Hangs up, goes out.
- 1430      In radio central. K is examining schematic from instruction book and B is adjusting receiver according to the values given

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by K.

- 1437 K goes back up to light off the gear again. B now wearing 22Js phones.
- 1440 Fires set up. B begins routine check of voltage at terminal point through local oscillator circuit. Again the local oscillator.
- 1448 B has spent most of the time watching the multimeter while K switches from AFC to manual frequency control. He says that AFC is not locking in.
- 1456 B goes out.
- 1500 B returns. Says that K got grass during tuning but they didn't get the information across because of bad head phones. B goes on with tuning.
- 1513 As before, B is making normal tuning adjustments to the scope picture and indicator pictures as reported by K over the phone.
- 1517 B says that he is going to check the video at the indicator with the oscilloscope. He leaves.
- 1530 In CIC. B is checking indicator using instruction book and oscilloscope. He is trying to get grass. The transmitter is not fired up.
- 1533 All he gets is 60 cycle note. B says that this indicates that the trouble is in the receiver rather than the indicator. B consults schematic. All of this time K has been sitting watching B.
- 1540 B checks ring time. K suggests that the T-R and ATR tubes may need to be adjusted. He says that the T/R has to be properly adjusted. B says that the T/R is properly adjusted. They get into a hassle as to the function of the T/R and ATR tubes and the meaning of grass.
- 1552 B and K decide that the trouble is in the receiver.
- 1555 K reading the instruction book asks B if he checked crystals after he changed TR. He did not reply.
- 1558 B goes to the door. Opens it and hesitates, then he leaves. Comes back and takes the test leads from the oscilloscope and leaves again.
- 1602 In radio, B is continuing to make screwdriver adjustments and then checking with K to see what happened.

MAN-ORIENTED DIARY

Ship: IX

Observer: B

- 0935 S. ET/2 is working in IC repair shop. He is removing the rectifier from a volt-ohmmeter and is going to use that as a replacement part in another meter of the same type. He says that they have a great deal of trouble getting this type of test equipment repaired. He hopes to make one good meter out of

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- two bad ones and turn the other in for repair.
- 0943 Uses soldering iron and round nose pliers to connect rectifier into the "new" meter. He looks around and can not find the solder. He goes on without it.
- 0945 Fits broken section of bakelite frame in place and slips new meter back into case. Checks meter. Polarity is reversed.
- 0946 Again removes meter from case. Detaches leads previously fastened, using iron and pliers. Switches the leads, then re-fastens them and fits meter back into case.
- 0952 Tests meter. Says that the "new" rectifier is only a little better than the one that had been in the meter.
- 0953 Tightens retaining bolts which hold meter face in place.
- 0955 Removes home-made wire wound resistor from old meter.
- 0956 Zero's vacuum tube volt-ohmmeter.
- 0957 Measures resistance of homemade resistor.
- 1000 Decides that both meters should be sent in for repair. He says that the tenders do not do good, careful work. He would rather have the parts so that he could repair things himself.
- 1002 Takes battered voltmeter from drawer and inspects it. Writes request for tender repairs. This particular meter has been sent in before and now bears a tag reading "no parts".
- 1017 Leaves.

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MAN-ORIENTED DIARY

Ship: X

Observer: F

- 1540 C. ET/SN sits in ET shack while observer explain forms.
- 1550 C. ET/SN called from ET shack to adjoining CIC - for no SC PPI sweep.
- 1554 Returns to ET shack for instruction book - other ET (S. ET/SN) says it is for brushes. Leaves book and returns to SC.
- 1559 C rotates range crank - sees echoes change so antenna is rotating but PPI sweep doesn't move.
- 1600 Goes to ET shack to get flashlight. Thinks field of PPI is off. Returns immediately from ET shack and unscrews metal outside cover of field.
- 1602 Flashes light around scope connections. Makes bearing bug rotate automatically. Says antenna is rotating electrically but PPI isn't sweeping.
- 1604 Returns to ET shack and looks in instruction book. Looks up list of possible causes of bug sweep without PPI sweep. Decides to test tubes 1501 and 1502.
- 1608 Returns to gear and takes out unit on left of PPI. Sees it is wrong side and closes.
- 1611 Opens unit on right of PPI. Flashes light inside. Starts to

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- reach inside but withdraws hand. Flicks off power switch, Withdraws 1501 and 1502 from right side and returns to ET shack to test them.
- 1613 Puts proper adjustments on tube tester. 1501 doesn't read any conduction in half of it but glass of indicator is smashed. C thinks movement of tester may be off and checks other half of tube. Some weak deflection for this half, but reads bad also.
- 1617 Puts in 1502 tube and sets tester. This tube also reads weak conduction.
- 1620 C takes out new tube from desk in ET shack - tests it on tube tester. This reads bad so trouble must be with meter. Quartermaster enters and kids C.
- 1623 C says FT has other tester, but should be finished with it. I follow him to plot room but they say tester is in Mark 25 room. We go up there. He explains that FTs only have simple meters and have to borrow testers, etc. Also, he says that ETs take care of fire control parts. He finds tester in transmitter room and returns to ET shack.
- 1629 Tests 1507 (a 6V6) asks S. ET-SN how to use part of other tester. Tube tests good.
- 1632 Tests 1501, a 6SL7 GT - tests bad. Low emmission "like 90% of bad ones". Writes in record book, by which they order parts, that 1501 was replaced. Locks up tester. S asks if motor tested. C says he will replace tube which is amplifier, for motor, then if doesn't work he will check motor. We go down to midships tube locker. Passage is crowded with people lined up for mess.
- 1638 We return to CIC room. C flashes light around motor unit on right to see where key groove is.
- 1640 He replaces tube. Closes unit on right which is all a control amplifier circuit for synchromotor in center.
- 1642 Turns on gear. Bug turns but PPI sweep still does not turn.
- 1644 Flashes light around center unit - under PPI scope. Looks at and feels wires and connections. Pulls out unit on right again.
- 1647 Fingers external controls - says no intensity for PPI. Then switches to battle shorts. Interlocks have cut off PPI ion. Now there is a beam again but still no sweep.
- 1650 Looks at motor amplifier unit a little longer, sets the removed front panels off to one side and knocks off for chow. Says will look at motor after chow.

**TROUBLE-ORIENTED DIARY**

Ship: XI

Observer: A

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- 0850 CRV receiver drawing too much plate current causing a load resistor to burn up. U, ET/SN and C, ET/SN are working on it in ET shack. U is about to measure resistance of the charred resistor. They are hooking up the vacuum tube voltmeter. On turning the "on" switch, the meter fails to light up - its not possible to tell immediately what the trouble is - not even possible to tell whether the instrument is plugged in because of its location on the shelf above. Rather than investigate further, U takes a multimeter from another shelf and measures the resistance of the charred resistor. He reports that he finds it down 10%.
- 0855 U is out after replacement tubes. He is going to get them from spare parts storage.
- 0900 He brings back 2 tubes from the store room. One appears to be a 5 UB 4 - the other a smaller tube. He then removes two acorns and one amplifier tube from the receiver and proceeds to take them into the CIC to test. P, ET/2 had taken the tester into CIC with him.
- 0905 L, ET/3 comes in to get a fuse for the RCK which has just gone out and which he believes needs a fuse replacement.
- 0910 U brings back the tubes and is replacing them in the chassis, indicating he has found one that is faulty and is replacing it. And he believes the set will work all right now.
- 0915 They are buttoning up the chassis. The symptoms were smoke from the burning resistor. The cause was hypothesized to be the bad tube. U indicates the tube is not the one which feeds the resistor which has been charred. However, there are apparently other things going out which require the men to leave the set. They are, therefore, concluding it is satisfactory for operation and are closing up the chassis. At this time U is going into radio central to work on another difficult intermittent problem with another CRV. He is attending to a cable on the front of the chassis. He unbuckles a plug which he reports to be minus a screw and asks the radiomen if they had been working on the gear at all. One of them reports that someone had without identifying who it was - implying that it probably was an ET - but it worked all right without that screw before. Then they hypothesize that the trouble is a short in the coaxial cable which extends from the plug which is minus the screw. The radioman who is assisting, D, is doing considerable maintenance work on the electronic gear. He is taking out another model chassis from the rack of CRV to work on it. At this time there is also a report that there is a persistent squeal in the TDZ which will need attention. The SG is still out, and the Mark 25 radar is being used for search purposes. The principal symptom of the SG is that the scope pattern has been lost. The trigger pulse is intact, that is the keying pulse

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- is present, but there is no high voltage. At the moment there is no likely hypothesis as to the cause except the one that the high voltage rectifier tubes may be out. L is suggesting that they be pulled and replaced. P send M, ET/SN in to check the voltages on the console which controls the transmitter voltages. That is the variac on the front panel. He is using a multimeter to check the voltages across the various taps for transmitter voltages. He apparently finds them intact. He buttons up the console and goes back to join P in the transmitter room. P and M are now studying the manual, endeavoring to determine what the difficulty is. The current hypothesis being that it is in the transmitter somewhere.
- 0930
- 1000 P and M are now working on the SG transmitter. They think they have isolated the trouble in the high voltage section but have no idea what the nature of the trouble is. They decide to take out the modulator section which feeds the high voltage. In order to take out the center frame they have to loosen a large number of setscrew connections and remove the grid caps from a couple of mercury rectifier tubes.
- 1010 They are still loosening connections. They are now ready to slide out the entire high voltage section which they place in the middle of transmitter room floor.
- 1015 P is just looking over the high voltage section on the floor. M is looking in the manual table of illustrations. He moves to the front of the set with P. P leaves. M remains just peering at the inside of the set.
- 1020 P comes back with a multimeter. In setting it up to use, he finds that he has only one complete lead. The tip is broken off the other. So he now takes a pair of pliers and a wire and makes an improvised tip for the meter.
- 1022 The men are removing heavy power resistors from the inside back of the high voltage section. They are measuring the resistance between points of several connectors and the chassis. L has come in at this point to join the other two and is now reading a trouble shooting guide of the SG manual. He is reading the section on power. He leaves.
- 1025 P and M continue to measure the resistance of several connections and the continuity of others, in this power supply section that remains within the chassis after the modulator high voltage driver has been removed. They turn to the manual and trace circuits in one of the circuit diagrams with their fingers.
- 1030 They are still looking through the manual.
- 1032 All three ETs are now huddled over the instruction manual for the SG. For the most part they are tracing wires in the power supply section.
- 1045 Observer B takes over. P is kneeling in front of the transmitter section of the SG radar. P is systematically checking for

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- shorts or opens using a Weston Selective Analyzer. They have checked all of the tubes and fuses in the transmitter section and feel now that some component must be responsible. They originally hypothesized tube failure or fuse failure on the basis that the trouble occurs suddenly. They localized the trouble to the transmitter section because they got a trigger pulse in the mod-gen section but not at the transmitter.
- 1055 All tubes and fuses are checked. L and P sit and peer into the front of the set.
- 1057 M checks the transformer that feeds the magnetron for opens. He is using the same meter that P was previously using.
- 1058 L comes in bringing an extension light which he attaches to the set so that they will be able to see into the main frame better.
- 1059 D, the lead radioman, sticks his head into the transmitter shack and reports that the TBS is finally working. The trouble was a tube.
- 1105 P ties down the interlocks and prepares to put power to the set.
- 1107 P throws the main switch and departs for CIC to take voltage readings at the variac of the range and train indicator. The purpose of this is to see if the voltage is getting through to that point.
- 1109 L leaves.
- Observer A takes over again in the transmitter room.
- 1115 There has been a cessation of activity as far as work on the SG is concerned. The ETs are going back to the shack. They are getting ready to eat.
- 1300 Observer A takes over in the transmitter room where the men are again working on the SG radar. They have just replaced the high voltage driver section. They put it back in the main frame to take wave forms from the transmitter section and are in the process of hooking up the oscilloscope in the mod-gen drawer at the top of the transmitter. At the moment P and M are working on the instrument.
- 1310 The men are now testing the pulse form from the driver with the oscilloscope. They are measuring it from the pins of a tube. They are also measuring it from one of the driver terminals to ground. They have decided there is some instability in the pulse so they are now pulling out the modulator-generator drawer to investigate the tubes in the repetition-rate oscillator. They pull 2 of the tubes and look at them. They go out to test them.
- 1315 U comes in while the men are still out and starts depressing the transformer current button for delivery of the total DC which is included on the front of the main frame. As the other 2 men come back, he calls their attention to a large arc which

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- occurs when he pushes the total DC button. On investigation they find that it arcs when the transformer voltage variac on the console is set at a low value. They turn off the set. They pull out the keyer tubes and the resistor which is arcing.
- 1320 It has been decided that the high voltage capacitor must in some way be responsible.
- 1330 L is removing the high voltage capacitor.
- 1335 P, M, and C are testing the high voltage capacitor to see if it is shorted. They are testing it with a multimeter. It is not shorted. They are unable to test if it is open because of the high voltage required. So they decide to put in a new capacitor.
- 1340 L leaves to get a new capacitor. P says that probably water which has seeped in around the set has led to rusting which is causing a short and is causing the capacitor to misbehave. Therefore, they intend to try a new capacitor.
- 1350 The set is still out. The capacitor is still out. All the ETs are waiting because the high voltage capacitor has not arrived.
- 1420 The capacitor has now arrived and they are installing it in the SG. L is doing the installation. The rest of the men are sitting around and watching him put it in.
- 1500 The capacitor has been replaced. Its connections are all complete and the unit fires up and behaves normally. The main frame is reassembled.

TROUBLE-ORIENTED DIARY

Ship: XI

Observer: B

- 0115 In CIC. SG is off the air. Watch officer says the SG is transmitting at about 50% efficiency. (This is same gear on which diary ended at 1500.)
- 0130 In transmitter room. P. ET/3 is sitting down drinking coffee while L. ET/3 works in the set with M. ET/SN assisting. They are attempting to remove the transformer that heats the cathode of the magnetron but are having a great deal of difficulty removing the bolts which hold it in place.
- 0145 L leans too hard against a mercury tube and breaks it at the base. There is some question as to whether or not they have another one in stock. P goes out.
- 0155 P returns and he and L go out. M trying to remove the obdurate nuts. It seems that a 5/8" end wrench is required and their largest is a 1/2".
- 0200 L returns as M gets the bolt loose. They proceed to disconnect the leads to the transformer. L says that many spare parts are stowed in hard to reach places. Faulty transformer

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was located by applying voltage across it and getting a reading of 4.0 volts instead of the required 6.3 volts. While L and M go down to get the spare, P confirms this with resistance measures.

0205 M comes in. L knocks off for a smoke.  
0207 L returns and holds light. He and M examine transformer in an attempt to find out what is holding it.  
0210 L asks M to remove meter drawer.  
0212 P returns. No spare mercury tube. Electronics materiel officer says (according to P) that they will get one from another ship tomorrow.  
0218 P gives L a hand in the removal of the transformer. M stands by. P says that the TBS is still not putting out.  
0225 P goes out to radio central to check the TES. L continues to work on the SG.  
0230 P and L examine SG transformer and try to figure a way to remove it without bothering the wave guide.  
0236 P and L each have an 18" screwdriver prying transformer from wave guide.  
0240 M returns. He had found a mercury tube. L and P continue to work on SG.  
0246 P is unbolted U shaped section of wave guide at a choke joint.  
0300 Section of wave guide removed. L, P, and M still working.  
0302 P goes out. Returns almost at once.  
0310 D, lead radarman, comes in. Shoots the bull with P.  
0315 Removes old transformer.  
0322 L and M begin to bolt new transformer in place.  
0335 L removes door to duplexer compartment.  
0340 L works on SG. P and M are sitting nearby. It appears to be a job which one man can do better than two.  
0347 P gets up and checks with L to see how things are coming. L looks around on the deck for bolts. Work is delayed frequently because tools and parts are not carefully placed aside where they can readily be retrieved. L goes to ET shack and gets bolt. P takes over and bolts wave guide section in place.  
0350 Now L is working.  
0358 The electronics materiel officer comes in. Has been Junior Officer of the Watch. Goes into transmitter room and squats down. Talks about broken mercury tube with P.  
0401 M puts bolts back in meter drawer holes and bolts it into place. Wave guide section is now in place with but 3 bolts to be tightened.  
0410 L replaces door to duplexer compartment.  
0415 L says that there is now a mismatch in the wave guide because they bent it out while they were prying with the large screwdriver. P and M take over. L sits down with the electronics materiel officer.

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- 0420 P checks it. He says that there is no mismatch. L consults manufacturers instruction book to settle the argument.
- 0423 P and M use heavy screwdrivers in an attempt to bend wave guide junction to correct the mismatch. They are not too successful so resume previous contention that no mismatch exists. Electronics materiel officer departs. ( )
- 0434 L takes over again. There is now general agreement that a mismatch exists between the duplexer and the wave guide and the L - shaped section of the wave guide.
- 0436 L again loosens the bolts and nuts holding the wave guide and the L - shaped section of the wave guide.
- 0437 P suggests prying it with a screwdriver against bulkhead.
- 0443 Use battle lantern for fulcrum and with large screwdriver they pry against wave guide.
- 0446 Replace duplexer to try for fit. The wave guide was bent a little too much. L gets a hammer and pounds the wave guide a little. Duplexer tried for fit again.
- 0448 Side of main frame at duplexer level was replaced by L. P starts to replace leads to transformer.
- 0452 Electronics materiel officer returns with wooden mallet and section of 2 x 4 to correct mismatch. Is told that it is unnecessary. He puts lumber on deck, removes coat and stands by.
- 0455 L recalls that they haven't tightened down the bolts at the wave guide choke. This would have been more easily accomplished before they replaced the side of the set. ( )
- 0457 Electronics materiel officer returns his wedges and mallet to repair shack.
- 0458 L goes out. P and M work on the set. P is tightening bolts on wave guide.
- 0500 L returns with hot coffee from CIC. P again removes side from main frame and proceeds to tighten bolts.
- 0508 M replaces 304's. Stands by to tune up set. L goes to CIC to turn the radiation switch on the range and train unit. Throws main switch and prepares to tune set. The blower motor on the magnetron makes a noise. Electronics materiel officer suggests they check that before leaving.
- 0513 They check the blower. M goes to CIC to turn up variac.
- 0515 The electronics materiel officer discovers that the noise previously attributed to the blowers is caused by a loose shutter. He found this by pressing against it with a screwdriver.
- 0519 They short out the interlocks of the bottom door and prepare to take wave forms on SG test scope. They light it off with the radiation switch off. Smoke issues forth from the duplexer. They cut off the power. ( )
- 0522 Again light gear off and trace the smoke to shutter relay.
- 0540 P is working in SG, checking transformer connections. Electronics materiel officer is studying the manufacturers instruc-

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- tion book.
- 0547 Tested the set again. Something still smells hot but there is no smoke.
- 0548 M goes to turn the radiate switch on. Shut down and consult the instruction book.
- 0552 M replaces T/R box and the magnetron blower with the aid of L.
- 0553 Electronics materiel officer and P are still poring through the instruction book.
- 0557 P puts on long rubber glove and takes a waveform from the driver stage using the SG test scope.
- 0600 M goes to CIC to charge pulse width back and forth. Nothing happened at main frame. M returns.
- 0607 Pulls V-106 from driver, tosses it to M who checks it on tube tester. It checks OK.
- 0615 Takes waveforms from grid of V-106.
- 0730 P, L, and M have the driver unit of the transmitter out on the deck again. They are hooking up meters to check the bias to the 304s.
- 0735 The electronics materiel officer comes in. Sends L for an extension cord and light. They are kneeling before the open power supply taking voltage measurements.
- 0745 It was inferred from the reading that the variac is OK. The electronics materiel officer sends L to bed. He goes out but reappears. He asks P where something is and then leaves again.
- 0748 L back with a resistor to put in series with the meter so that they can measure high voltage. The electronics materiel officer suggests everyone go to bed.
- 0754 Tries out resistor - meter arrangement.
- 0759 They begin to make random checks again.
- 0805 They are using a "Christmas bulb" technique, where if you replace enough parts etc. it may work.
- 0830 to 1100 The men decide to knock off and get some sleep, so all ETs hit the sack. When they get up they decide to contact Ship XV which is tied up nearby to see if their chief ET and another ET can come over and help out. They agree and the ship's boat is dispatched for them.
- 1100 to 2000 The chief and an ET, who came over from Ship XV are taking complete charge.
- 2000 to 2200 The chief is very careful and deliberate in taking wave forms from ground (usually) to tube pins at resistor leads. He is careful to let patterns stabilize and has instructed the men hovering over him about the effect of body capacitance on observed wave forms.
- 2200 to 2230 He has now checked all the wave forms up to the keyer tubes and has checked most of the voltages. At this point, however,

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- there are some voltages he can't check since they are 15 KV and he has no KV meter or high voltage probe.
- 2400 They find that the pattern just as the signal enters the keyers is blocked. On studying the schematic they decide that one particular resistor, if open, would cause that blocking. It, however, is deep in the modulator driver section. They decide to take the driver section out for some voltage checks.
- 2405 Everyone is having a round of coffee.
- 2415 The driver unit is out and they are taking it into the ET shack to make voltage and resistance checks.
- 2430 Still making voltage and resistance checks. A lead broke off a tube cap and will have to be replaced.
- 2445 Still making systematic continuity and resistance checks on the driver unit. The chief encountering so much difficulty he is considering going to his ship, taking out his driver unit and replacing it here. Then if the set works he can localize the trouble in this unit.
- 0100 Still checking continuity and resistance of driver unit.
- 0115 No progress. Work has degenerated into a bull session consisting of about 6 ETs discussing equipment over coffee.
- 0130 Radio communication is being made between the chief and his electronics materiel officer on Ship XV. They are discussing the possibility of bringing their driver unit over and trying it in on this SG. The electronics materiel officer wants them to take this ship's defective unit to the Ship XV.
- 0145 Decision is made to take this ship's unit to Ship XV.
- 0800 L and M are working on the SG. They seem to be going over the same things that the chief from the Ship XV went over. They are taking the waveform at the point where the trigger pulse is supposed to go into the driver. They get a beautiful 60 volt pattern but no trigger.
- 0845 L and M have just pulled out the driver unit. After bringing the unit back from the other ship, they failed to connect C101. They are reconnecting the lead to C101 and then they intend to replace the driver.
- 0930 The connections in the driver unit are checked and the driver is replaced. Trigger pulse is satisfactory until the radiate switch on the console is thrown. M and L are still working.
- 1000 L and M still at it. They have lost their trigger pulse again and are back up in the mod-gen drawer making screwdriver adjustments in an attempt to regain their trigger pulse. They spend much of their time sitting on the deck staring into the power supply section.
- 1015 Last night P and L and the two men from Ship XV took the transformer and driver unit of the SG transmitter to Ship XV. They installed it in the Ship XV's SG and it did not work. They then replaced their driver assembly with the driver assembly

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from the Ship XV and that combination worked. That was about 0500. While the ETs reassembled Ship XV's radar the electronics materiel officer on Ship XV took the driver unit from this ship into the workshop and returned in about a half an hour claiming that he had discovered and replaced an open condenser and that the assembly was repaired. The ETs wanted to try it in Ship XV's set but it was too late so they brought it back here. They put this SG back together again but it didn't work. Further examination revealed 3 leads in the driver assembly which were not reconnected by Ship XV's electronics materiel officer. These and the one to C101 were later connected. M says that the proper wave form is going to the 304s but they are unable to measure the voltage. They are currently operating on the hypothesis that the voltage is insufficient to trip the driver.

- 1030 L and M remove the driver unit (with the power supply section) from main frame and take it to the ET shack.
- 1115 L and M are still working. They plan to work "two on and two off" from now until they get the SG repaired. M is checking the components in the driver assembly by means of resistance checks. L was called down to Sonar but found that the trouble had been corrected before he got there. He returned and is starting back to work.
- ( 1145 L and M continue making resistance checks on the driver assembly of the SG. L calls out the test points and M makes the test and reads meter. In one case the schematic had a resistor rated at 1 meg ohm where a check with the parts list reveals that it should read 0.1 meg ohm.
- 1337 P and U are working on SG driver assembly. They are making resistance and capacitance checks. They just unsoldered C114 because it responded as though an audio frequency was passing through it and they were unable to read its label. After they had it out they found that it was adequate. They tested it out of the set and are in the process of replacing it.
- 1350 P removes another capacitor from the driver assembly and tests it. He complains that he is getting only half the rated voltage on his checks.
- 1358 P looks up the stock numbers of C114 and C126.
- 1400 P goes to bin stowage in the fantail to placement capacitors for C114 and C146. He took about 8 min. to locate them. The system is new and not all parts are in the bins.
- 1412 P continues making resistance checks on the driver unit.
- 1530 The driver unit is reassembled and reinstalled in the SG.
- 1550 He tests the SG. It radiates, but no sweeps are present.
- 1600 The TDX is not putting out well. Complaints have been

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coming in since 1500. U is supposed to fix it but he is currently testing tubes in the SC which just went out.  
1610 P is studying the SG instruction book in transmitter shack. U is trying to get the SC back on the air. The symptom of the SC trouble was the loss of the PPI picture. At present there is no sweep on A scope.  
1640 SG is back on the air. It is completely repaired and adjusted. The trouble was a bad condenser. C146 and possibly C114.  
1654 P reports to CIC watch officer that the SG is back in action.

**PLACE-ORIENTED DIARY**

Ship: XI

Observer: B

- 0930 The SG is broken down. It has no sweeps; P. ET/3 (lead ET) feels that it is a tube in the transmitter. Has tested all tubes in that drawer. Set still out.  
0935 M. ET/SN and F studying schematic of RBK receiver.  
0936 D. lead Rm comes in with hatful of tubes. Is systematically testing each. U. ET/SN is working on second drawer of communication equipment, TBS. L. ET/3 brings in RDZ manual. Sits on deck and starts to read up on the theory of operation. M goes out.  
0937 P still tracing RBK schematic.  
0940 M returns. Squats beside P.  
0942 U takes wattmeter, connects it to output of his gear.  
0943 Man comes in and tells P that he needs lead for wattmeter. P says to take one from RDZ.  
0945 D is working on the RDQ.  
0946 D and U get into squabble about TBS.  
0948 M returns with two tubes.  
0949 SG fired up with interlocks shorted out. Tuning indicator and oscillator indicator need scale reading. Other meters zero.  
0950 P cuts SG main switch. Joins M studying schematic of SG. L reports RDZ back in action. He leaves.  
0953 M checks fuses with meggar. Checks OK. He replaces them.  
0954 L and C, ET/SNs bring in new top drawer for TDQ. Exchange tubes. C watches while D works. L assisting.  
0955 U still working.  
0957 "TBS putting out 4" says U. "That's too much" says F. They are having trouble because the lead to the wattmeter is not the proper size. Can't check output.  
0958 TBS repair to wait until TDQ is repaired. TDQ is self-oscillating. Trouble reported when other ship couldn't raise them on that frequency.  
1001 TDQ back in action. 717A was out. They carry a spare TDQ

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but it wouldn't work either. The spare is still out of action.  
1003 U and C are still working on TBS. They are now using the  
head phones.  
1005 D comes in. Points out that the squelch was too good. When  
the suppressor is on it squelches all reception.  
1007 L connects wattmeter to output of TBS.  
1008 D goes to work on TBS with U.  
1013 D goes out. U says, "I'm going to load this thing up."  
1014 D returns with tube shields.  
1016 Transmitter of TBS doesn't register on wattmeter. U thinks  
wattmeter is at fault. Starts to remove it.  
1018 D discovers oscillator is not properly tuned. He tunes it.  
1019 Wattmeter registers.  
1020 U tunes TBS transmitter to 24 watts.

TROUBLE-ORIENTED DIARY

Ship: XII

Observer: C

1900 SC radar is out. No signal on the video. All ETs have been  
on the trouble all afternoon. They have tested the transmitter  
with a wattmeter. There is plenty of grass on the scope in-  
dicators. The receiver is OK. Have checked video circuits  
and they are OK. The electronics materiel officer and the  
ET/C are confused. No one knows what the trouble is. One  
ET suggests duplexer is faulty. They put IFF signal on video  
and get it all right. Problem seems to be the receiver is  
not keying. (The SC will not pick up contacts.)  
1905 No work being done, as the ETs are puzzled.  
1910 Two ETs begin to check the duplexer. They get a wrench and  
uncouple behind the duplexer. Are going to remove the du-  
plexer from the coaxial line.  
1930 Bridge calls for an ET to look at a repeater. They have to  
wake up one who was off duty. They get the duplexer off  
(with great bother because it is relatively inaccessible) and  
take it into ET shack. There it is disassembled. (It is an  
old style duplexer).  
1940 C is called to bridge. Comes back with news that SG is out  
all the way.  
1945 They think they found the duplexer trouble. The old time  
spark-gap electrodes were not pointed at each other and may  
have detoured the electricity. There are no T-R tubes in this  
job. SG-1b is back on. CIC kicked out the overload and  
couldn't get it started again.  
1955 Two ETs still cleaning up the duplexer.  
2010 The lead radioman just stuck his head in and hollered that the

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- TDZ is out. An ET takes off for the radio central to check the TDZ . He comes back. All he did was key the transmitter a couple of times; then asked CIC to make radio check again. They did and it was loud and clear. (ET thinks the bad check came when the ship rolled a little.)
- 2030 They came back from CIC with the news that the SC-3 receiver input cable fell off when they were working on the duplexer end. They are going to solder the cable back on to the receiver.
- 2045 Bridge wanted to use the Mark 25 fire control radar to range on a ship. The ETs talked them out of that one. This radar won't lock on a surface target. Instead it oscillates back and forth along the length and eventually bounces off.
- 2100 An ET comes staggering in to report that the evaluator took his flashlight away from him and sent it to the starboard torpedo director. Since he was the one who was soldering the cable, he had to stop, come back into the ET shack, and get another flashlight. He is still trying to solder the cable back to the receiver in combat.
- 2115 There is a call for an ET from radio. Something is out.
- 2200 They are still trying to tune the SC after installing the duplexer and soldering the cable.
- 2400 When they shoved the left-hand drawer on the SC back in, a loose terminal board shorted everything to ground. They started over again.

TROUBLE-ORIENTED DIARY

Ship: XIV

Observer: B

- 0900 TBL transmitter is out. P. ET/1 who is lead ET is in central. He says that he's completely confused on this one.
- 0901 He's attempting to tune it. Adjusts 1st amp. tuning. Gets only a slight change. Says it's weak. Radioman suggests that maybe they ought to let it go since they're getting by.
- 0902 P adjusts the succeeding stages running them back and forth. He adjusts antenna coupling, the 3rd amplifier stage, and the antenna inductance.
- 0904 He is getting 200 milliamps on the P.A. plate current but this isn't what it should be. P tells radioman to leave it up on that since they need it. They are going to try to send the message out before they decide whether to shut it down and tear it apart. P says they couldn't load the TBL up properly.
- 0911 A chief communications man has been beefing to P about the lack of transmitters.
- 0912 P has been standing around waiting to see if the message is going out all right. He's getting out on the set but has very low drive so they will work on it tonight when they don't need it. He leaves.

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PLACE-ORIENTED DIARY

Ship: XIV

Observer: B

- 0730 Diary is in the ET shack. D, ET/1 and P, ET/1 are working on the spare parts records and W, ET/3 and Z, ET/SN are standing by.
- 0737 The electronics materiel officer comes in and suggests that they tune up the TBS to test it. W and Z go to radio central.
- 0740 W returns and asks where all of the tools are. P hands him a set of keys.
- 0755 D and P are still working on spare parts paper work.
- 0800 W returns and reports that TBS is set up on frequency. He stows his tools and leaves.
- 0801 Z comes in and asks for keys.
- 0804 D sends Z to bin stowage with the first cardex book to continue with inventory of spare parts.
- 0806 D and P are still working on the records.
- 0808 W returns. He reports that the MBE still has high background noise. D hands him a megger and tells him to check the resistance at the antenna.
- 0811 The chief radioman comes in. He has a band switch which won't work. P goes with him.
- 0812 The electronics materiel officer comes in and gives a crystal to D. It is being loaned for a special frequency that is needed for next weeks operations.
- 0815 D continues to work on the records.
- 0817 P returns and gets small Allen wrenches from tool box. D asks, "Is it a xtal?" P says, "I'm not sure. I am taking an assortment of stuff with me."
- 0818 W returns with megger. P goes out. D asks, "What did you get?" W says, "10". D says, "Doggone it, how did it drop down."
- 0819 D records on equipment log for TCS in the pilot house. D is now consulting an AN/ARC stock list and making some computations.
- 0821 The electronics materiel officer comes in. Asks D to give him a reference for not turning on the SC within 50 miles. D says, "Janap 195, sect. 3x." The electronics materiel officer accepts it and leaves.
- 0823 W gets a Radar Electronics Fundamentals and starts to read it.
- 0824 D gives a problem to W. D asks, "6980, what wavelength is it?"
- 0825 W goes to bench and begins to compute.
- 0827 W checks answer with D then returns to his reading of "special circuits" chapter in Radar Electronics Fundamentals.
- 0828 D leaves. P comes in with band switch knobs. He says,

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"There is one suggestion that I might make. Let them secure the communications circuits for at least two hours with a different circuit every night." He pointed out that overseas they had no opportunity to do anything to the gear until it went out.

- 0831 P is replacing a set screw in the bandswitch knob of the TCS. He said that it was a nuisance that the equipments required both Bristol and Allen wrenches and as a result the various screws were always getting fouled up because some one always tried to tighten a screw or bolt with the wrong wrench.
- 0837 D comes in. He and F discuss the notion of a schedule for securing the gear. D doesn't think it is very necessary since it is possible to come up on the desired frequency with another set.
- 0840 Z comes in and asks about cards, particularly the green ones. D tells him that the green cards indicate "parts receivable."
- 0842 Z leaves.

**TROUBLE-ORIENTED DIARY**

Ship: XV

Observer: E

- 0830 SG blanked out. Proceed to CIC. ET-C and an ET-3 working. They have front of indicator out.
- 0845 ET-3 says he looked at trouble shooting chart in instruction book and found that when no sweeps on any scope except monitor scope it is V 909. So C waits for tube to replace it. It is usual procedure to work from instruction book for ET but he says the C usually works from schematic.
- 0847 Chief keeps looking for something in back of indicator. Probably a tube.
- 0855 Sent for 6SN7. Can't tell why he figured it was that one. Too many people in CIC. Sent a striker for the tube.
- 0900 Striker returned with tube. Chief sent him to shack to test tube before putting it in.
- 0901 Returned with tube. Chief putting it in indicator.
- 0902 Told striker to throw the power on. Set started up. Waiting for time delay.
- 0905 When set comes on they get a sweep only when the IFF switch is on. Picture poor.
- 0909 Chief looks at set but can't quite figure out what's wrong now.
- 0912 Chief sends striker to cut off power.
- 0914 Turns on light and called for schematic. Checks block diagram.
- 0923 Electronics materiel officer and chief check block schematic. They have sweeps on monitor at all times but sweeps on the A-scope and the PPI only when the IFF switch is on with consequent loss of range step on A-scope. Tracing steps thru block diagram to find point at which discrepancy first appears.

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- 0925 Chief looking for particular tube. Difficult to find.  
0929 Electronics materiel officer has decided that the only thing to do is to check stage by stage. Chief goes to check cables.  
0955 SG repairs completed. Troubles were: bad fuse (removable type) jarred loose and a low tube 6SN7 and a shorted tube, 6J7.

**MAN-ORIENTED DIARY**

Ship: XVI

Observer: B

- 0725 ET shack - Ship moving out of harbor. Lead ET3 has gone to get wattmeter - has just returned with ME 11/u R-F wattmeter. Lead ET at work bench. Lead ET uses long nose pliers to remove wattmeter's crystal from its holder.
- 0727 Efforts to remove crystal are in vain. He is trying to pull it out with the pliers.
- 0728 Places crystal holder in bench vise. Pulls some more. No success.
- 0730 Hands ET/SN multimeter. Decides he can't figure out how the crystal is removed and looks in rack in ET shack to see if they have a book on that meter. Books are in different sections according to equipment type. He looks under "Misc. & Technical". He takes a paper backed book from the rack to work bench and consults it.
- 0732 Still consulting book which is the appropriate NAVSHIPS publication. He first looks in index but is now leafing through one page at a time. It is a small book and such a procedure is relatively easy.
- 0735 Says that the crystals are not interchangeable and that you have to send the whole meter in to be calibrated. He was unsure as to just whom you would send the meter.
- 0737 Lead ET still consulting book. He is now studying the general description of the meter. Picks up crystal holder and compares it with a diagram. Says that "It says here you can use one of the IN21 - Bakers but we will have an error of up to 20%."
- 0738 ET/SN came in and gets a couple of cutters and asks for knife. Lead ET says there isn't any. ET/SN leaves. Lead ET, "I don't see why that crystal won't come out."
- 0740 Goes to tube locker in port passageway to get a crystal. Writes IN21-B wattmeter, AA on a pad on the inner door. Gets crystal.
- 0742 Returns to ET shack.
- 0743 Looks in upper right bench drawer for long nose pliers. Doesn't find them. Looks around for them.
- 0745 Goes through CIC to radio central looking for ET/SN. Decides that he is in emergency radio. Returns to ET shack.

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- 0746 Brushes off wattmeter assembly with camel's hair brush. Gets large pair of pliers. ET/SN returns. Locks in parts cabinet for leads.
- 0747 Unwraps crystal. Puts crystal holder in vise and files with three-corner file.
- 0749 ET/SN leaves with solder and iron, 2 kinds of tape, and a roll of heavy duty insulated wire. Lead ET removes crystal from holder. He files knurled knob from holder. Inserts new crystal in holder being careful not to touch it.
- 0752 Replaces meter front.
- 0753 Replaces crystal holder and crystal. Puts tools away. Goes through CIC to transmitter room. Connects antenna lead to TDZ wattmeter. It now registers. (It didn't before.)
- 0756 Retuned TDZ by adjusting knobs E, F, S while watching grid current meter and wattmeter. He gets 13 watts.
- 0757 Puts wattmeter behind TBS in radio central. Warns radiomen that crystal is unprotected.
- 0758 Returns to ET shop.
- 0759 Polices up bench, replaces publication in rack. Puts personal effects in drawer of spare parts cabinet. Turns on radio.
- 0800 Returns folder of forms to observer. Finds that he hasn't finished Training Utilization Form so he sits down and works on it.
- 0801 Drill GQ called.
- 0802 Electronics materiel officer comes in bringing his paper work with him. Lead ET tells him of the wattmeter repair.
- 0804 Lead ET still working on questionnaire.
- 0805 As 0804.
- 0806 Lead ET returns folder to observer. Picks up repair form. Begins to work on it; reporting wattmeter repair.
- 0820 Abandon ship drill. Lead ET goes to his station. Electronics materiel officer leaves.
- 0822 Observer D comes in. Sits on workbench and begins to write.
- 0825 Observers D and B alone in ET shop.
- 0827 Lead ET returns. Continues to fill out repair record.
- 0829 Still working on repair record, our form.
- 0831 Still filling out repair record.
- 0834 Same.
- 0836 He completes repair record. Hands it to observer.
- 0839 Lead ET sitting on bench shooting the bull with observer D.
- 0842 Same.
- 0844 Same.
- 0851 Lead ET goes to head.
- 0852 Electronics materiel officer comes in.
- 0857 Lead ET returns with piece of fried chicken which he proceeds to eat. Electronics materiel officer leaves.
- 0900 Lead ET still eating chicken and chatting.

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- 0903 Finishes eating, discards carcass, polices up bench.
- 0907 Man brings in a tube to be tested. Electronics materiel officer comes in. Lead ET tells man that he can't check anything but rectifiers. Told him to take tube to sonar for testing.
- 0910 Electronics materiel officer leaves.
- 0914 Lead radioman brings last of radiomen's job questionnaires and leaves.
- 0915 Lead ET goes out to radio central. Tunes in the RBO and changes music for crew's entertainment.
- 0918 IC man comes in, asks for an 807 vacuum tube. We all go to tube locker.
- 0920 Opens wrong door of tube locker. Looks in, closes door and locks it. Obtains tube from other locker.
- 0923 Returns to shop. Goes to emergency radio. Checks ET/SN.
- 0924 to see if he needs help. "No". Back to shop.
- 0925 Back in shop. Lead ET is checking work log. Checking to see what crystal goes in Mark 25.
- 0926 Opens tool drawer. Looks for long nose pliers. They aren't there. ET/SN has them.
- 0928 Goes to tube locker. Gets three IN21-B crystals. Makes no record. Locks door. Leaves.
- 0932 In director of Mark 25. Opens panels to receiver section. Finds crystals in receiver and removes one crystal holder. Removes crystal from holder.
- 0935 Replaces crystal with new crystal in holder. Replaces holder in receiver.
- 0937 Calls radio central for ET/SN. Tells ET/SN to fire up the gear.
- 0940 ET/SN called in that set was lit off.
- 0941 Makes operating adjustments. Checks crystal current, 1 and 2 close to balance, 3 and 4 out of balance, very little crystal current on 4. Thinks that the trouble could be one of the 6AK5's in the AFC unit (in the IF strip).
- 0945 Taps 6AK5's. Hypothesizes that it might be that the crystal is bad. Checks 6AK5's for gas (visual check).
- 0946 Lead ET decides to get new 6 AK5's from tube locker and check by replacement.
- 0950 Lead ET returns with 5 6AK5's. Cuts the filament current; replaces bottom tube in strip. Puts old tube back in carton that new ones came from. Turns filaments back on.
- 0952 Replaces second tube from bottom.
- 0953 Replaces third from bottom. Then fourth tube. All tubes check. He starts to check by replacement more of the 6AK5's in the IF amplifier strip. Ringtime doesn't drift as much, but the AFC is still not locking in properly.
- 0958 Decides to try another new No. 4 crystal. Removes crystal

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- and makes replacement exercising care not to touch crystal with fingers.
- 1002 Presses "operate" button. Allows set to warm up, checks crystal currents. Says that "we can be sure that crystal was good and IF strip is all right. Now's the time to break out the old instruction books." Indicates that original hypothesis was based on past experience with this particular gear. "You get to know all of the creaks and groans."
- 1006 Rechecks operation of gear. Still no soap.
- 1007 Shuts down gear. Collects tools and spare parts.
- 1009 Leave.
- 1010 Mark 25 room. Lead ET looks in instruction book. Says that the books on Mark 25 are exceptionally difficult to find anything in.
- 1012 Consults schematics in corrective maintenance section. Is now looking up second schematic. Leaves them, Goes to second, then third book.
- 1015 Looks up trouble shooting diagram in corrective maintenance section.
- 1017 "Well, they don't tell me much. They say to do everything I have already done." Leafs through book.
- 1018 ET/SN comes in and gets keys and long nose pliers.
- 1019 Lead ET studies "Balanced Converter Schematic."
- 1021 Lead ET studies "Crystal Current Meter" schematic.
- 1022 Lead ET studies "Transmitter Receiver" schematic.
- 1024 Lead ET consults index then looks back for a schematic. Looks it over and apparently decides that it isn't the right one. Turns to another one, looks it over. Leafs through looking at various schematics. Can't seem to find the one he wants.
- 1027 Speculates that the trouble might be due to moisture in the wave guide.
- 1030 Still checking schematics. ET/SN comes in. Asks if lead ET needs any help. "No." ET/SN leaves.
- 1035 Lead ET goes up to director to get the tubes and check them in the tube tester.

MAN-ORIENTED DIARY

Ship: XVI  
Observer: B

- 0845 GQ - Lead ET-3 goes from ET shack to Mark 25 Rm. Turns on filaments. Makes verbal check of radio central. Looks around in transmitter room. Goes to CIC.
- 0850 Lead ET-3 in combat. Checks VF-1 repeater, makes minor operating adjustments. Check VF. There is some old intermittent trouble in VF. He doesn't bother it.

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- 0853      Goes to radio central. Puts on headphones. Plugs them into radio receiver (RBB). Tries to tune out distortion. Electronics materiel officer comes in.
- 0855      Goes to CIC. Checks receiver on forward bulkhead there. It is an RBS. Reports that he wouldn't be able to give them the desired frequency coverage, unless they can do without this receiver on another circuit.
- 0859      Returns to radio central. A radioman suggests that the RBS in radio central be piped into CIC and used to guard the other circuit. ET-3(Lead) returns to CIC and asks for confirmation. Nobody knows but they don't think so. He returns to radio central and checks with radioman again. Returns to CIC. Came up on the desired frequency on RBS in CIC.
- 0902      Comes out saying everything was squared away.
- 0904      Checks operating voltages on MK 25. Puts into operating condition. Checks OK.
- 0905      Goes to CIC to check calibration of MK 25 with VJ. He calls director to find that they are holding transmission checks.

MAN-ORIENTED DIARY

Ship: XVI

Observer: D

- 0715      Began diary in ET shack. Y. ET/SN standing in shack. Electronics materiel officer comes in. The two of them set up a coil arrangement for demagnetizing the electronics materiel officer's wrist watch which became magnetized yesterday while working on the SR.
- 0720      Completes task. Electronics materiel officer leaves. Y puts things away. Y goes into CIC. Stands around.
- 0721      Goes over to VF - looks at it. Comes back with ET-3. Lead tells him to check out the TBL.
- 0725      Lead ET goes out and comes back with a wattmeter and attempts to take crystal out of wattmeter.
- 0727      Y goes into radio central and arranges with lead radioman to have signal piped into the TBL in emergency radio. He grabs a set of headphones goes back to repair shack - picks up a multimeter and goes to emergency radio.
- 0732      Plugs headphones into patch panel and listens. Takes front off TBL patch panel, undoes a wire in it and checks it. Attaches probe to wire lead in unit and observes the

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- meter.
- 0736 Removes cap from plug - examines wire connection. Says there's two possibilities for trouble - 2 wires were fastened together, or two of the wires weren't connected to the plug properly and are probably shorting across.
- 0738 Goes after tools.
- 0739 Returns - removes plug. Cuts off wire - cleans it back.
- 0741 Continues to clean the wires back.
- 0745 Decides that a better piece of wire would be advantageous. Goes to repair shack to find another piece. It's a piece about 1 foot long. The unit he is working on is a jack box containing 5 jacks. It is connected with the patch panel in radio central.
- 0749 Returns to emergency radio with wire and tools. Removes wire where it connects to the main line.
- 0750 Hooks up extension cord. Unsuccessful since there is no outlet. Looks all over for outlet.
- 0752 Goes to repair shack for more tools.
- 0753 Returns with plug. Connects soldering iron to it and hangs soldering iron up.
- 0755 Cleans back new wire that he brought in.
- 0756 Gets call from radio central to check on TBL transmitter output. Goes to TBL and starts tuning it up.
- 0759 Radio central calls. They tell him never mind. So he goes back to cleaning the wire back.
- 0801 Finishes cleaning wire. Gets soldering iron.
- 0802 GQ sounded. Goes to battle station in the main battery. Y operates the MK5 Mod 6 console in the main battery.
- 0819 Wordpassed to abandon ship. Left main battery and went to abandon ship station on quarter deck.
- 0820 Left Y until GQ is over.
- 0859 Secures from GQ. Returns to emergency radio. Y returns. Plugs in soldering iron. Goes back to cleaning wire.
- 0900 Clips other end of wire at right length. Starts cleaning back the wires.
- 0903 Completes cleaning of the wires. Gets the soldering iron and heats the connection of the old wire to the main line to unsolder it. Gets the old wire loose.
- 0905 Begins to clean back wires of the main line.
- 0907 Connects new wire to main line.
- 0908 Gets solder and iron and begins soldering the two connections.
- 0909 Finishes one connection. Connects the other two wires and begins to solder them together.
- 0910 Completes this soldering. Sets soldering iron aside. With rubber tape begins taping up the connections.
- 0912 Finishes taping the connections. Tests the connection by use of the multimeter.

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- 0913 Puts front back on jack box.  
0914 Took other end of wire and begins connecting it to the plug.  
Puts on the shield casing. Connects each wire to a terminal  
of the plug.  
0915 Screws it down.  
0916 Gets soldering iron and solder, and solders the two connec-  
tions to the plug.  
0919 Completes fixing plug. Plugs it in a jack.  
0920 Calls radio central. Unable to test the job since transmitter  
is in operation. Checks connection with meter and they're OK.  
0921 Gathering tools and materials together.  
0924 Still getting them together.  
0925 Starts back to repair shack.  
0926 Puts tools and materials away.  
0929 Y looks at list of things to do.  
0930 Gets screwdriver and pliers from drawer. Goes into radio  
central.  
0931 Begins removing front off RF antenna input box.  
0933 Removes front. Finds antenna wire has broken in two.  
0934 Begins cleaning end of wire in the box.  
0935 Begins cleaning wire on the plug end.  
0936 Called over speaker by lead ET. Told to fire up the MK25.  
Goes into MK25 room and fires it up.  
0939 Returns to radio central. Finishes cleaning back end of wire.  
Working in antenna box. Removes screw holding connection.  
0942 Takes the parts and returns . to radio shack.  
0943 Begins to prepare the connections for putting back together  
again.  
0945 Begins to remove broken wire from connector lug unit by  
use of soldering iron and pliers.  
0949 Unable to remove broken wire from connector lug. Gets a-  
nother lug. Fastens it to the wire leading from the jack.  
0950 Solders the connection.  
0953 Goes to radio central. Connects wire back to antenna. Hooks  
up grounding strap.  
0955 Having a little trouble with connection of wire to antenna in  
the box.  
0956 Finally gets it so he can slip lug on screw.  
0958 Puts on the nut and tightens it down. Unable to tighten it ade-  
quately. Needs long nose pliers to get in there.  
0959 Goes to repair shack to get pliers.  
1000 Returns and tightens down nut. (Have only one pair of large  
long nose and lead ET has them, so must use small pair to  
do it.)  
1002 Has it fixed except for putting the front back on. Y is asked  
to set up frequency better on RBC receiver. He tunes it up.  
1004 Returns to work on antenna box. Unable to screw connector

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- lug down tight enough with pliers he has - has to wait till he can get the others.
- 1005 Returns to repair shack. Sets tools down and looks at work list. Says that four of the jobs can't be done since they don't have the parts for them.
- 1007 Looks in instruction book to find out what part is needed on TBL. Found what's needed but doesn't have it.
- 1010 Puts manual and tools away. Settles back with an orange.
- 1017 Stops at radio central and gets large long nose from lead ET and finishes the job on the RF antenna box.
- 1020 Front is back on and job is complete.
- 1022 Arrives at aft spare parts room. It is very well organized, neat, and easy to get everything. He looks in bins that have old parts in them. Finds the bin containing old knobs. Looks through them and finds knob that might work.
- 1025 Leaves spare parts room. Goes to radio central. Looks at knob on TCS and finds that he is unable to do anything since the set is in use. Says that he would have to see if it fits this evening.
- 1027 Returns to repair shack.
- 1028 Goes to see lead ET in MK 25 room to return keys and ask if he could help.
- 1030 Can't help so returns to repair shack. Gets out spare parts file and some expenditure invoices on parts received. He is going through the invoices and checking off the parts with the spare parts files allowance book.
- 1036 He's checking to see if these invoices are listed in the allowance book.
- 1043 Still checking the invoices against the allowance book. Those listed he adjusts for in the allowance book. Those not listed he writes "not listed" and sets them aside.
- 1045 Sets allowance book aside. Gets out master allowance book to see if those items not listed are just overlooked when making up the file or if they are actually not allowable to a destroyer. Out of seven invoices there were four not listed.
- 1047 Man comes in and borrows screwdriver.
- 1048 Man comes in and wants 4 amp. fuses. Y looks in fuse box for them.
- 1050 Unable to locate any fuses for the man. Man leaves. Y goes back to work on invoices.
- 1052 Man returns with screwdriver. Leaves.
- 1055 Completes work on invoices. Puts those not listed away and throws away those he has accounted for.
- 1056 Puts away the allowance books.
- 1057 Y leaves for the head.
- 1100 He has not returned.
- 1107 Y returns. Takes TBS instruction manual from shelf. Opens

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it up to section on parts and spare parts. Looks up an armature needed for spare parts. Gets parts requisition and fills it out according to information in instruction book.

1114 Finishes. Puts this information, and other parts ordered, in record book for entering items that have been ordered.

TROUBLE-ORIENTED DIARY

Ship: XVIII

Observer: F

- 0630 M. ET/2, went to the bridge to light off the radar repeater for SG and SR. It didn't work and he returned to chart house to see if all the filaments were lighted. At this time he was interrupted to set up receivers. (They are going out and need communications more than the VJ repeater). ET returns to chart house. Looks at block diagram to check which tubes were in sweep circuit. Pulls them out of the circuit and tests them. Tests V101, V102, V103, and V110, V111, V112. Sweep driver 807 is completely dead.
- 0710 New 807 from down below tests OK on tube tester in ET shack.
- 0714 M plugs it in VJ driver and goes to bridge to check sweep there.
- 0718 M returns from bridge. The sweeps are still not present.
- 0719 Tests V-106. It is OK.
- 0720 Tests V-107. It is OK.
- 0722 He brings test oscilloscope from ET shack. He tries to open VJ door more completely to use it but has to force it against pipe. Manages to plug scope into 115 volt D.C. outlet in VJ driver. Scope is on VJ relay unit which is under driver.
- 0725 Tests outlet from plate to ground at test point which goes to the indicator in the bridge. Nothing on test scope.
- 0728 Swings chassis to his left revealing underneath - tube sockets, resistors, capacitors, etc. Glances over them.
- 0729 Lights cigarette. Takes flashlight out of tool box in ET shack. Stands on navigators stool and flashes light around more closely. Chassis is swinging back and forth with ship and he has to steady it.
- 0733 Checks input to equipment itself and finds no input.
- 0735 Removes scope and opens door of delay unit which gives input to the driver. Removes V-501 and V-502 and goes to ET shack to test them. Tubes are OK. Removes V-504, V-504 tests OK.
- 0738 Goes to test point 502 with scope which is on cabinet alongside. Gets the proper negative pip.
- 0740 Swings open door of driver again and puts scope to TP102 to see if there is any change. There isn't. Therefore, signal is

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- lost between TP 502 in delay and TP 102 in driver.
- 0743 Turns from flow chart in equipment manual to detailed schematic of delay unit.
- 0744 No output from terminal strip of delay unit. Scope trace jumps now and then indicating that something is breaking down.
- 0745 Leaves to check presentation on scope on bridge. Still no sweep. Wants to check V-504 again it is the last tube in delay circuit. It has an input to it but no output from it.
- 0750 Gets multimeter from ET shack and swings over delay unit chassis and flashes light around underneath. Tests from ground to pins of V-504 with voltmeter for proper voltage according to page in instruction book. Pins 2 and 5 read too low. Pin 2 reads 10 volts and should read 275 volts. It is the plate of V-504.
- 0755 Scans underneath the chassis with light again. Decides to unhook a capacitor going from plates of V-504 to ground. It is not on the schematic, but it must be the one on the schematic going from the plate to transformer to ground.
- 0800 Hooks up soldering gun to voltage outlet in delay, and with longnose pliers and gun opens capacitor connection to ground. Now plate voltage reads normal. Apparently a bypass capacitor to ground has broken down and shorted out the plate voltage.
- 0805 M goes to bridge. Repeater sweep is now normal on P.P.I. Previously it was just a dot. Since we will be steaming until this evening and the equipment works OK with the capacitor open, ET will leave the equipment on and not solder in a new capacitor until later. Bad capacitor is still in set with wire curled back 3 inches from anything it could touch. Bridge wants to operate now and can do so without replacement of the part.
- 0810 Puts tools back in spare parts box. Returns to ET shack.

MAN-ORIENTED DIARY

Ship: XIX

Observer: C

- 0715 Combat reports bearing on VJ in combat is 180 degrees out of phase with remainder of indicators and master radar. R. ET-2 and H. ET-1 are looking for the cause. R first looked in VJ radar repeater driver cabinet, and saw a gassy 807. Although this was not taken to be the cause, the 807 was replaced and a 6SL7 also.
- 0730 H is now looking through synchro and VJ repeater manuals. He now tests fuses on front of VJ repeater driver cabinet with a Weston multimeter, mod. 664.

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- 0735 He goes back to manual for VJ. Then he opens center panel containing tubes and tests with selective analyzer on terminals 157, 158, against 159, measuring synchro voltage from synchro amplifier to synchro, across the three fields of the synchro.
- 0740 Goes back to the synchro manual and re-examines it. Works back and forth between manuals for VJ and synchro, checking on the kind of servo system. Takes meter back into VJ driver cabinet. Measures between B61 and ground, checking to see if the leads on the synchro rotor had been reversed. Refers to VJ manual, Sect. 7, change 1., driver wiring diagram. Goes back to same terminal board and tests again. Remarks, "These two windings are wired right, so they should be in phase." (Synchro rotor and servo motor).
- 0748 Goes back to test on same terminal board, using Weston Selective Analyzer. Looks at VJ manual. Retests between 157-57, 158-58, 159-59 Synchro Stator. Refers again to VJ schematic on the driver unit. Looks at diagram on bottom back of center hinged panel in VJ cabinet. Is looking for wave forms. Decides not to use scope.
- 0754 Goes back into CIC. Comes back in and makes screwdriver adjustment on screw above tab marked "servo-gain." Thought there might be too much gain, so cut it down. This was not the trouble. Goes back into CIC. (He said later he was looking for coffee in CIC.) Comes back and makes another adjustment on same screw. Decides trouble might be in the servo system circuit.
- 0756 Refers again to VJ schematic of driver. Works back to last thing in circuit, the output transformer. Goes back into CIC.
- 0803 Comes back and readjusts the same screw. Touches top of output transformer case to see if it is warm.
- 0804 Turns off driver unit. Takes same meter and tests terminal on back, behind transformer, measuring resistance of transformer.
- 0805 Tests between back and 807 tube cap lead.
- 0807 Continues to test at terminals behind output transformer and 807. Remarks, "It is practically impossible." Tells a striker to get a big soldering iron.
- 0810 Refers to schematic, which now is on floor by VJ driver cabinet. Begins to test with same meter in same area as before. Fingers output transformer again. Pulls out another Weston Selective Analyzer and goes back to testing at same points again. Remarks to another ET: "We have a transformer that is supposed to read 4500 ohms and it only reads 400."
- 0815 Takes hot soldering iron and long nose pliers and begins unsoldering leads behind transformer. Tests terminals again.
- 0820 Gets out Stock list of VJ parts, looks up transformer number.

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- 0822 Sends striker down to look for the part. Says transformer is partially shorted somewhere because it is down from 4500 to about 300 ohms resistance. Takes transformer leads loose. Says he will get the other transformer and checks first to make sure the manual reading has not been changed.
- 0840 Striker arrives with output transformer. It is tested. It checks same as the old one. He remarks, "that ain't what the book says." He decides to quit and take the card sort, since the repeater is not that important.
- 0845 Y. ET/3, continues work on the VJ with soldering iron. Apparently, the output transformer is not damaged. They are not going to change it. (Later in the day the ETs discovered there was nothing wrong with the VJ at all. They had taken it apart several weeks ago and had neglected to line up the synchros at that time. So all they had to do was loosen about three screws and line up the synchro system.)

TROUBLE-ORIENTED DIARY

Ship: XX

Observer: E

- 1105 Lead ET/2 is working on an AN/ARC. Oscillator (V106) has 50 volts positive on the grid which it shouldn't have. He measures between grid and screen grid and finds 125 megohms.
- 1110 Refers to circuit diagram to find out why. Stops to talk to another ET. He gets out the tube tester. This work is being done in the ET shop with five other ETs all working in here at the same time. Tests oscillator tube; checks OK.
- 1117 Takes meter points. Turns on power, takes DC voltage reading to grid of oscillator. Now he doesn't get 50 volts positive. Remarks that it is strange. Puts probe in crystal position. Decides he doesn't know what's wrong unless it is the meter. Changes multimeter and finds 40 volts. He decides it is the meter.
- 1120 Gets out third meter and finds there is somewhere between zero and 40 volts. Uses second meter. Hooks into meter outlet. Measures DC voltage. Tunes receiver with dummy antenna.
- 1125 Plugs microphone in and keys transmitter, gets 1 3/4 volts of output on receiver. Looks at instruction book. Says previous ET aligned set to low end of frequency band so can't tune to high end now. He has no wave meter or any other equipment so can't even tell whether it's oscillating. The only thing he can do is to measure voltages and they seem all right.
- 1130 Turns set on after replacing chassis in makeshift test cradle. The cooling fan starts screaming. It sounds as if something

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- caught in it or a bearing is burned out. He removes motor and fan. Finds wire mesh caught in blades.
- 1131 Replaces motor and fans. He has much difficulty in replacing it. It doesn't seem to fit. Takes AN/ARC out of chassis to put motor in. It doesn't seem to want to fit.
- 1137 Now he has it in.
- 1140 Goes into tool kit for Allen wrench. Can't find it. He asks other ET. Looks for wrench.
- 1142 Finds Allen wrench. Uses it to fasten motor in. Has trouble matching screws with holes since fan doesn't fit too well. Takes motor out again.
- 1145 Unscrews Allen screw in fan blade. Removes fan blade from rotor. Puts motor back into chassis. Motor lines up fine. Tries to put fan blade back on rotor but space is too small.
- 1147 Puts chassis back in test cradle. He can't figure anything else to do. He's taken all voltage checks, etc., but can't find anything wrong.
- 1150 Plugs in probe for meter. Turns set on. Fan still hasn't got the blade on. Tunes receiver output with multimeter. Goes to talk with another ET concerning another set.

**TROUBLE-ORIENTED DIARY**

Ship: XX

Observer: E

The bridge was unable to communicate on one circuit so a man was sent down to notify the ETs. The electronics materiel officer was in the repair shack at the time so the man told him and the lead ET/2 that communications on the tactical bridge circuit could not be maintained. The electronics materiel officer and lead ET/2 went to survey the trouble. The TDZ was used in this circuit. The electronics materiel officer and lead ET went into the transmitter shack where the TDZ is located and they found that there was almost no power output as measured by a power output meter attached to the antenna output. They tried to tune up the set to get more power output but were unsuccessful. They opened the set and got into the two boxes containing the lighthouse tubes of the power amplifier stages and the triplex stages. The electronics materiel officer took the lead in all this work. He had the lead ET/2 get four new lighthouse tubes and he began switching the old ones around to see if he could get a better balance. He was not successful. When the ET/2 returned with the tubes the electronics materiel officer began a series of actions consisting of putting in new tubes and switching them around in various positions to attempt to get the best balance. In the

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process of doing this he jammed one of the tubes in its socket and bent one of the many contacts that the tube slides into. It became necessary to get that bent contact out or replace the socket. The lead ET went for a pair of tweezers and a screwdriver. He had another man (an ET/3) take the tools back. The ET/3 worked on the contact to get it out. It was a very small place to work and required about 10 minutes for them to get the contact out. When it was out the electronics materiel officer had him put the tube in. They closed up the set and fired it up. The ET started to tune it up but the electronics materiel officer took over. He was not able to get the output above 2 watts. After tuning around for awhile he discovered he was on channel 1 rather than channel 2. (He had earlier changed it to channel 1). He locked the dials with the ET's help and he dialed channel 2. He then fired the set up again. The ET once again started tuning up the set. The electronics materiel officer also got his hands into it and between them they finally got the set up to about 8 watt output. The electronics materiel officer turned off the set again and opened up the drawer. He had the ET/2 assist him in switching the tube in the first power amplifier stage with the one in the third tripler to see if he could get a better balance. He put one of the tubes in while the ET/2 put in the other. He was not getting it in. The ET/2 got his in, then finished putting the other one in. They then closed up the set and fired it up. They both attempted to tune the set again. They finally got it up to ten watts. The electronics materiel officer said that would have to do (the output should be about 30 watts). He tested the circuit and found the communications could be made satisfactorily. He then checked the power amplifier current and found that it was above what it should be for operation. He told the ET that the tubes wouldn't last long with the power amplifier current so high (it was about 100 MA and it should be about 60 MA). He said the circuit was needed so they would leave it as it was and replace the tubes if they burn out. The ET/2 got some spare tubes out of the spare parts and laid them by the set. They then left the shack.

**MAN-ORIENTED DIARY**

Ship: XX

Observer: D

- 1350 In repair shack. Decided to latch on to the first man that goes to work. Five ETs are in shack - also two sonarmen, a radar-man and the electronics materiel officer.  
1401 Electronics materiel officer tells K and W, ET/SN to check the

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- operation of the RBS in radio.
- 1402 K and W go into radio shack and look at RBS. A radioman is working in front of set receiving messages from the RBA that is located just below the RBS. The ETs are unable to work on the RBS since the RM is working there. The ETs decide to remove the RBS and take it into the radio shack. Both ETs look the situation over and find the RBS is bolted to the framework of the ship. The only way they can remove the set is to first remove the RBA to get at the bolts. They can't remove it since it is necessary to keep it in operation. They decide that if they remove the RBB that is next to the RBA they will be able to get at the bolts.
- 1415 K goes into repair shack and tells the lead ET the situation. The lead ET tells him to go ahead.
- 1417 He goes back to radio and tells W.
- 1418 They both pull out the set and take it into the Xmtr shack and set it on the floor.
- 1419 They come back and W tries to get at bolts holding the RBS. He is unable to do it. K tries it. He is unable to do it. They decide they'll have to remove the RBA to do it. K tells W to go ask the electronics materiel officer what to do.
- 1422 W goes into repair shack and tells the electronics materiel officer the situation. The electronics materiel officer tells him he can't remove the RBA since it would require taking the circuit off the air. The electronics materiel officer tells him to take the signal generator in and hook it up to the RBS and check it that way.
- 1427 W takes the signal generator down and prepares it to take into radio. He takes the signal generator into radio and sets it on the floor by the RBS.
- 1429 K is removing the antenna lead from the RBS.
- 1430 He screws another lead into the antenna input. He lays the loose end up over the back of the set. They need another long lead to hook the antenna lead to the signal generator.
- 1433 W goes into repair shack to get one. K hooks up the signal generator to a power outlet. He organizes the necessary connections of the signal generator.
- 1438 W returns with a short lead. It is far too short to go between the signal generator and antenna lead of the RBS. He says that's the only one there is.
- 1441 They're talking about setting the signal generator up on something but decide that can't be done. The only way they see to do it is to make the RM get away so they can work where he is. This can't be done since the RM is receiving messages.
- 1443 K goes into repair shack and tells the lead ET the situation.
- 1447 The lead ET and K return to radio. The lead ET looks over the situation. He tells K and W the only thing that can be done is to

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- wait until the RM is through.
- 1452 The lead ET and K go back to repair shack. The lead ET tells the electronics materiel officer the situation. The electronics materiel officer tells him to secure it for now and do it some other time. K returns to radio and tells W they are to secure. W and K go into transmitter shack and pick up the RBB on the floor. They bring it in and put it back into its frame.
- 1456 W leaves. K screws in the RBB.
- 1458 H picks up antenna lead to RBB and tries to get it up to the back of the framework. He is unable to do it alone. He asks the lead RM to help him. The lead RM helps him get the lead up the back of the frame. He screws in the regular antenna lead. He picks up the power cable and screws it into its input.
- 1501 He removes the lead from the antenna input of the RBS and screws in the regular antenna lead.
- 1503 He secures the signal generator and picks everything up. He goes back to the repair shack.
- 1504 He sets the signal generator back upon the work bench where it is kept.
- 1506 K asks lead ET what to do next. Lead gave him some spare parts requisitions to work on.
- 1508 Lead explains what he wants done.
- 1510 K studies over requisitions.
- 1513 K goes to lead and asks for further instructions on them.
- 1514 One of the requisitions was given to the electronics materiel officer who studies it over, then signs it. K takes it and completes filling it out.
- 1515 K picks up other requisitions and checks over first one, making additions here and there to complete filling them out. Goes through the rest of the requisitions. Picks one out.
- 1517 Is studying it over. Takes pen and starts filling it out.
- 1518 Takes BuShips catalogue of Navy material and goes through it looking for part's numbers.
- 1520 Puts it back and takes out another one. Is looking under "Motors" trying to find the appropriate part.
- 1521 Finds it. Writes the appropriate name, descriptions, and number on the requisition form.
- 1523 Still filling out the requisitions.
- 1524 Still filling it out. Repair shack has 12 people in it. It is really jammed up.
- 1525 K is still working on requisition.
- 1530 Lead comes over to see how he is doing.
- 1532 Still working on requisition.

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MAN-ORIENTED DIARY

Ship: XX

Observer: D

L. ET/3, is working on the AM-12/A PR-1 receiver. Earlier he found that the set needed a new tube. There were no tubes of this type available so nothing had been done on this set since yesterday evening when the trouble was found. Earlier this afternoon the electronics materiel officer was in and questioned L. ET/3, and the lead ET/2 about the set. When he learned there were no replacements for the tube he said there must be one that could be substituted for it, one that has similar characteristics. He told L to see if he couldn't locate one and try it in the set to see if it would work. Since then the ET/3 has been looking in the tube manuals. He found one that might work.

- 1540 Tests tube on tube tester. Removes tube from tube tester and puts it back into the TN-1/APR 1. Has trouble putting it back. Gets tube back in. Tests to make sure they're in well.
- 1544 Cleans up tools around his work.
- 1545 Puts TN unit back in set. Hooks up power cable to set and turns set on.
- 1547 Hooks up probe lead to antenna input. Puts other end into test antenna outlet.
- 1548 Plugs in phones and listens.
- 1550 Revolves probe lead.
- 1551 Begins hooking signal generator up. Plugs it in and turns it on.
- 1552 Hooks up lead to signal generator and antenna input of receiver.
- 1553 While listening with headphones, manipulates knobs on signal generator.
- 1554 While listening, turns frequency knob of receiver.
- 1555 Goes back to signal generator, adjusting multiplier and frequency dial.
- 1556 Electronics materiel officer asks if he got anything. Electronics materiel officer takes over and, with phones to his head, he adjusts the frequency dial. Gets a very weak signal. Says this was a case in which substituting tubes was no good.
- 1558 Tells ET/3 to get capacitor. Hooks capacitor to the output lead from signal generator and hooks a probe lead to the input of the receiver.
- 1559 Touches the two together, off and on, while listening over the phones. Tells ET/3 that it's just not doing the trick and they'll have to try something else or wait for the right part.
- 1601 Electronics materiel officer leaves set.
- 1602 Man comes in and says that the bridge is not receiving any tactical signals. Electronics materiel officer leaves to check on it.

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- 1603 The ET/3 begins to secure the equipment.  
1605 He secures the signal generator.  
1606 Puts instruction manual in book case.  
1607 Secures the receiver and pushes it to back of the work bench.  
1608 He is putting tools away that he was working with earlier: such  
as screw driver, pliers, and soldering iron.  
1610 Still organizing his work space.  
1611 Is now putting the tube tester away under the work bench.  
1612 Has begun a general clearing up of the repair shack.  
1614 Just standing around talking.  
(The tube that was needed had been ordered some time ago but  
had never been received.)

Table 55  
Equipment Repairs Recorded in the Trouble-Oriented Diaries

Type of Gear	Trouble	Symptom	Unit of Gear	Repair by:	Type of Trouble	Spare Parts Used	Number of Steps*	Wrong Hypotheses**
1. Mark 26 radar	CR tube (loose prongs)	Presentation not tracking on scope	Mod.	ET/CASE ET/SN PC/2	Electrical	2 CR tubes	15	5
2. SG radar	Not found	No radiation	Driver unit	ET/1	Not found	1 tube	7	2
3. SG radar	Not found	3 triggers on scope	Indicator unit	ET/1 ET/SN	Not found	None	13	5
4. SG radar	Loose fuse, 2 bad tubes	No sweep on any scope but monitor	Indicator unit	ET/C ET/3 ET/SN	Electrical and mechanical	1 fuse 2 tubes	5	1
5. SG radar	Shorted capacitor	No scope pattern	Transmitter unit	ET/3 ET/3 ET/SN	Electrical	1 condenser	18	4
6. SG radar	Faulty transformer 3 bad capacitors	No HV Transmission 50% efficient	Transmitter unit	ET/3 ET/3 ET/SN	Electrical	3 condensers, 1 transformer, 1 tube	16	2
7. SL radar	Needed internal adjustment	Range bug jumped in and out frequently	Indicator unit	ET/3	Electrical	None	8	0
8. SL radar	1 bad tube	VF has no sweep when tuned to SL position	Indicator unit	ET/3	Electrical and mechanical	1 tube	10	0

\* "Repair step" refers to each time the worker engaged in a physical activity, with regard to the gear, which is different than his last activity.

\*\* If ET was observed to engage in a repair activity which did not result in a correction of the trouble, then it was inferred that he had made a wrong hypothesis.

Underlined rates took leading role in repair.

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Table 55 (continued)

Type of Gear	Trouble	Symptoms	Unit of Gear	Repair by:	Type of Trouble	Spare Parts Used	Number of Repair Steps	Number of Wrong By-Passes
17. TCS radio transmitter	Overload relay failed to kick out	Burning smell	Power supply	<u>ET/3</u> <u>ET/3</u>	Electrical	None	4	0
18. AW/ARC radio transmitter receiver	Needs aligning	Not given	Main frame	<u>ET/2</u>	Electrical and mechanical	None	12	2
19. AW/ARC radio transmitter receiver	ET tied two wrong wires together	No transmission	Main frame	<u>ET/3</u> <u>ET/3</u> <u>ET/SN</u>	Electrical	None	13	0
20. TDZ radio transmitter	Low PA tube	Loss of communication and low power output	PA stage	<u>ET/2</u>	Electrical and mechanical	4 PA tubes	14	3
21. TDZ radio transmitter	Shorted choke coil	Low output & overload relay out	Transmitter drawer	<u>ET/3</u> <u>ET/3</u> <u>ET/2</u> <u>ET/3</u> <u>ET/SN</u>	Electrical	1 choke coil	13	2
22. CRV radio transmitter receiver	Bad tube, bad resistor	Charred resistor, smoke	Main frame	<u>ET/SN</u> <u>ET/SN</u>	Electrical	1 tube	5	0
23. CRV radio transmitter receiver	Short in cable connection	Intermittent reception	Main frame	<u>ET/SN</u>	Electrical	None	3	0
24. TDQ radio transmitter	Broken wire on crystal, bad tube	Sporadic cutting out in set.	Crystal and main frame	<u>ET/2</u>	Electrical and mechanical	Crystals and 1 tube	16	5

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Table 55 (continued)

Type of Gear	Trouble	Symptom	Unit of Gear	Repair by:	Type of Trouble	Spare Parts Used	Number of Repair Sets	Number of Wrong Hypotheses
9. SC radar	Not found	No video signal	Not found	<u>ET/C</u>	Not found	None	5	0
10. SC radar	Leads in gyro reversed	True bearing indicator	Indicator unit	<u>ET/2</u> <u>ET/3</u> <u>ET/SK</u>	Electrical and mechanical	None	3	0
11. SJ radar	Bad tube, bad maggie, out of adjustment	Weak returns. Limited range	Receiver unit	<u>ET/3</u> <u>ET/SN</u>	Electrical and mechanical	All transmitter tubes, T/R tube, maggie, receiver tubes	21	9
12. VJ repeater	Shorted capacitor	No sweep on VJ	Delay unit	<u>ET/2</u>	Electrical	1 tube	17	0
13. TBL radio trans-mitter	Gears needed oiling	Antenna indicator knob locked	Main frame	<u>ET/3</u> <u>ET/1</u>	Mechanical	None	8	2
14. TBL radio trans-mitter	Not found	Low output	Main frame	<u>ET/1</u>	Not found	None	1	1
15. TBL radio trans-mitter	Dirty switch contacts	No output on high frequency	Main frame	<u>ET/3</u>	Mechanical	None	18	3
16. TGS radio trans-mitter	Transformer overload. Jumper on overload relay	Burning, smoke	Power supply and relay	<u>ET/3</u> <u>ET/2</u>	Electrical	Fuses	7	0

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Table 56 (continued)

Type of Gear	Time to Isolate Major Unit	Time to Isolate Correct Circuit	Time to Isolate Correct Component	Time to Get Spares	Time for Repair After Diagnosis	Total Time for Repair
13. TBL	Immediately	Immediately	42 min.	None used	15 min.	1 hr. 7 min.
14. TBL	Not found	Not found	Not found	None used	Not found	Worked 12 min.
15. TBL	Over 2 hr. 20 min.	Over 2 hr. 20 min.	Over 2 hr. 20 min.	None used	40 min.	3 hr. 20 min.
16. TCS	13 min.	25 min.	25 min.	Not given	15 min.	50 min.
17. TCS	Immediately	Immediately	None used	Not completed	Worked 27 min.	
18. AN/ARC	Immediately	Not found	None used	Not found	Worked 50 min.	
19. AN/ARC	Immediately	46 min.	1 hr. 5 min.	None used	Corrected before diagnosis	Worked 1½ hr.
20. TDZ	Not given	Immediately checked	Immediately checked	Not given Not given	Not given	
21. TDZ	1 hr. 13 min.	2 hr. 34 min.	2 hr. 34 min.	Not given	1 hr.	Worked 3½ hr.
22. CRV	Immediately	Immediately	Approx. 10 min.	5 min.	Less than 5 min.	Over 30 min.
23. CRV	Less than 15 min.	Less than 15 min.	Less than 15 min.	None used	Less than 15 min.	Less than 15 min.
24. TDQ	Not given	Over 24 hr.	Over 26 hr.	Not given	About 4 hr.	Over 26 hr.

Table 56

Summarization of Various Time Intervals Occurring in the Repair of Equipment as Found  
in the Trouble-Oriented Diaries\*

Type of Gear	Time to Isolate Major Unit	Time to Isolate Correct Circuit	Time to Cor-rect Component	Time to Get Spares	Time for Re-pair After Diagnosis	Total Time for Repair
1. Mark 26	5 min.	30 min.	55 min.	18 min.	1 hr. 7 min.	Over 2 hr.
2. SG	Not found	Not found	Not found	5 min.	Not found	Worked 30 min.
3. SG	Not found	Not found	Not found	5 min.	Not found	Worked over 2 hr. 30 min.
4. SG	Not given	1 hr. 15 min.	1 hr. 15 min.	Over 30 min.	Not given	Over 1 hr. 25 min.
5. SG	Over 45 min.	1 hr. 15 min.	4 hr. 35 min.	30 min.	1 hr. 40 min.	Over 6½ hr.
6. SG	Not given	Not given	Not given	10 min.	Over 2 hr. 40 min.	Over 39 hr.
7. SL	Immediately	45 min.	45 min.	None used	Less than 5 min.	1 hr. 7 min.
8. SL	23 min.	1 hr.	1 hr.	4 min. & 2 min.	10 min.	1 hr. 10 min.
9. SC	Not found	Not found	Not found	None used	Not found	Worked 5 hr.
10. SC	Immediately	10 min.	10 min.	None used	Not completed	Worked 35 min.
11. SU	Over 13 hr.	Over 13 hr.	Over 13 hr.	12 min. & 16 min.	About 3 hr.	Over 16 hr.
12. VJ	Not given	Over 30 min.	Over 45 min.	4 min.	5 min.	1 hr. 40 min.

\* The equipment repairs in this table are the same as in the previous table (55). The order of the equipments in both tables is the same, so that this table may be considered an extension of the Table 55.

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Table 57

A Summarization of the Part the Electronics Materiel Officer Played in Thirty Repair Situations Expressed in Terms of the Number of Situations in Which He was Observed to Assume a Given Type of Role (Diary)

EMO's Part in the Repair					
	No Part	Consulted by ET	Checks on the Progress of ET's Work	Supervises and Offers Suggestions	Takes Active Part
Number of Instances	13	2	5	6	5

Table 57-a

The Number of Man-oriented Diaries in Which ETs were Observed to Perform Various Activities During Their Work Day, the Average Amount of Time They Were Observed to Spend in Each of These Activities, and the Per Cent of the Total Time (Observation Time With the Man-Oriented Diary)\* That They Spent in Each Activity

ET Activities	No. of Occurrences	Avg. Amount of Time Spent (min.)	Range of Times Spent	% of Total Time Observed
Working on Records	2	8	1 - 14	1
Accounting for Stores and Tools	3	42	5 - 77	12
Preparing Requisitions or Work Orders	3	14	7 - 27	4
Planning Work Schedules	0	0	0	0
Studying or Reading Electronics Materials	1	33	0	3
Discussing Electronics	0	0	0	0
Loafing, Engaging in Small Talk, etc.	7	23	5 - 65	15
Voluntarily Performing Non-electronic Duties	1	5	0	1
Involuntarily Performing Non-electronic Duties	1	7	0	1
Doing Preventive Maintenance Including Checking Operation of Equipment	1	55	0	5
Repairing Equipment Which is Not Immediately Needed	2	28	20 - 36	5
Trouble Shooting Equipment	7	46	3 - 90	31
Procuring Spare Parts	3	7	3 - 14	2
Cleaning up Work Space	4	9	1 - 12	4
Tuning Equipment	2	9	3 - 8	2
General Quarters Activities	5	27	13 - 57	13

\* Total time was 1047 minutes.

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Table 58

Ability Requirement Scale

The Amount of Each of the Given Abilities Necessary for Successful Mastery  
of Various Jobs as Rated by Each Subgroup \*

Abilities	BT	EMO	CIC	GUN	ASW	COMM
1. Ability to understand verbal materials.	B	B	B	B	B	B
2. Ability to learn and remember verbal materials.	B	C	C	C	C	C,D
3. Ability to make numerical computations.	C	C	B	B	B,C	C
4. Ability to use mathematical reasoning.	C	C	B,C	B	C	D
5. Ability to recognize and define problems.	B	A	B	B	B	C
6. Ability to show ingenuity.	B	A,B	B	B	C	B,C
7. Ability to plan and anticipate problems.	A	B	B	B	C	C
8. Ability to make sound decisions.	A	B	B	B	B	B
9. Ability to solve mechanical problems.	C	B,C	B	B	C	C
10. Ability to accurately read and record data.	B	B,D	B	B	B	B
11. Ability to interpret data from records and instruments.	D	C	B	C	A	E
12. Ability to interpret spatial patterns.	C	C	B	C	A	E
13. Ability to meet size and strength requirements.	E	E	C	C	E	E
14. Ability to coordinate body movements.	C	C	C	C	B	B
15. Ability to make accurate, quick, hand movements.	C	C	B	A,C	B	B
16. Ability to accept personal responsibility.	A	B	B	A	B	B
17. Ability to accept organizational responsibility.	A	C	B	B	C	B
18. Ability to maintain proficiency under emotional stress.	B	C	A	A	A	A
19. Ability to work effectively with others.	B	B,C	B	C	B	B

Legend: A. An exceptional amount of ability is required.  
 B. Above average but not exceptional ability is required.  
 C. About average ability is needed.  
 D. Somewhat less than average ability is required.  
 E. Very little of this particular ability is needed.

\*Note.—Each officer rated only those men under his direct supervision.  
 Cell values indicate modal category of response.

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Table 59

Ability Requirement Scale

Median Rank Values of Abilities Required for the Job of ET as Ranked By Electronics Technicians

Rank	Item	Mdn.
1.	Ability to recognize and define problems.	3.00
2.	Ability to maintain proficiency under emotional stress.	4.17
3.	Ability to learn and remember verbal materials.	4.50
4.	Ability to accept personal responsibility.	5.75
5.	Ability to make sound decisions.	5.83
6.	Ability to plan and anticipate problems.	7.00
7.	Ability to accept organizational responsibility.	7.50
8.5	Ability to understand verbal materials.	8.00
8.5	Ability to show ingenuity.	8.00
10.	Ability to work effectively with others.	8.50
11.	Ability to solve mechanical problems.	9.50
12.5	Ability to use mathematical reasoning.	10.17
12.5	Ability to accurately read and record data.	10.17
14.	Ability to make numerical computations.	10.83
15.	Ability to coordinate body movements.	12.50
16.	Ability to make accurate, quick, hand movements.	13.50
17.	Ability to interpret spatial patterns.	17.17
18.	Ability to interpret data from records and instruments.	17.90
19.	Ability to meet size and strength requirements.	18.63

Table 60

Ability Requirement Scale

Median Rank Values of Abilities Required for the Job of ET as Ranked By Electronics Materiel Officers

Rank	Item	Mdn.
1.	Ability to recognize and define problems.	1.40
2.	Ability to understand verbal materials.	4.25
3.	Ability to make sound decisions.	5.75
4.	Ability to learn and remember verbal materials.	6.00
5.5	Ability to show ingenuity.	6.75
5.5	Ability to accept personal responsibility..	6.75
7.	Ability to plan and anticipate problems.	8.25
8.5	Ability to solve mechanical problems.	9.00
8.5	Ability to maintain proficiency under emotional stress.	9.00
10.	Ability to accept organizational responsibility.	9.25
11.	Ability to work effectively with others.	11.00
13.	Ability to make numerical computations.	13.00
13.	Ability to use mathematical reasoning.	13.00
13.	Ability to make accurate, quick, hand movements.	13.00
15.	Ability to accurately read and record data.	14.75
16.	Ability to coordinate body movements.	15.88
17.	Ability to interpret spatial patterns.	16.00
18.	Ability to meet size and strength requirements.	17.20
19.	Ability to interpret data from records and instruments.	17.75

Table 61

## Ability Requirement Scale

Median Rank Values of Abilities Required for the Job of Sonarman Ranked By ASW Officers

Rank	Item	Mdn.
1.	Ability to interpret data from records and instruments.	2.25
2.	Ability to interpret spatial patterns.	2.75
3.	Ability to maintain proficiency under emotional stress.	3.00
4.	Ability to work effectively with others.	6.00
5.	Ability to learn and remember verbal materials.	6.33
6.	Ability to make sound decisions.	7.00
7.	Ability to make accurate, quick, hand movements.	7.75
8.	Ability to understand verbal materials.	8.25
9.	Ability to accept personal responsibility.	9.75
10.5	Ability to recognize and define problems.	10.00
10.5	Ability to accurately read and record data.	10.00
12.	Ability to make numerical computations.	10.25
13.	Ability to accept organizational responsibility.	11.00
13.5	Ability to show ingenuity.	13.00
13.5	Ability to coordinate body movements.	13.00
16.	Ability to solve mechanical problems.	14.00
17.	Ability to use mathematical reasoning.	14.75
18.	Ability to plan and anticipate problems.	15.75
19.	Ability to meet size and strength requirements.	18.77

Table 62

## Ability Requirement Scale

Median Rank Values of Abilities Required for the Job of Radioman Ranked By Communications Officers

Rank	Item	Mdn.
1.	Ability to maintain proficiency under emotional stress.	2.75
2.	Ability to accept personal responsibility.	3.75
3.	Ability to make accurate, quick, hand movements.	4.00
4.	Ability to work effectively with others.	5.75
5.	Ability to make sound decisions.	6.00
6.5	Ability to accurately read and record data.	8.00
6.5	Ability to accept organizational responsibility.	8.00
8.	Ability to learn and remember verbal materials.	9.00
9.	Ability to plan and anticipate problems.	9.25
10.	Ability to recognize and define problems.	9.67
11.	Ability to coordinate body movements.	10.00
12.	Ability to show ingenuity.	11.00
13.	Ability to understand verbal materials.	12.00
14.	Ability to make numerical computations.	13.25
15.	Ability to use mathematical reasoning.	14.00
16.	Ability to solve mechanical problems.	14.25
17.	Ability to meet size and strength requirements.	16.88
18.	Ability to interpret data from records and instruments.	17.58
19.	Ability to interpret spatial patterns.	17.80

Table 63

Ability Requirement Scale

Median Rank Values of Abilities Required for the Job of Radarman as Ranked  
By CIC Officers

Rank	Item	Mdn.
1.	Ability to maintain proficiency under emotional stress.	2.50
2.	Ability to interpret spatial patterns.	3.50
3.	Ability to interpret data from records and instruments.	4.50
4.	Ability to work effectively with others.	6.00
5.5	Ability to plan and anticipate problems.	7.50
5.5	Ability to accept personal responsibility.	7.50
7.	Ability to accurately read and record data.	8.50
8.	Ability to make sound decisions.	9.00
9.	Ability to make accurate, quick, hand movements.	9.50
10.	Ability to accept organizational responsibility.	10.17
11.5	Ability to learn and remember verbal materials.	10.50
11.5	Ability to recognize and define problems.	10.50
13.	Ability to show ingenuity.	12.30
14.5	Ability to understand verbal material.	12.50
14.5	Ability to use mathematical reasoning.	12.50
16.	Ability to make numerical computations.	13.75
17.	Ability to solve mechanical problems.	16.83
18.	Ability to coordinate body movements.	17.00
19.	Ability to meet size and strength requirements.	18.72

Table 64

Ability Requirement Scale

Median Rank Values of Abilities Required for the Job of Firecontrolman  
Ranked by Gunnery Officers

Rank	Item	Mdn.
1.	Ability to recognize and define problems.	3.25
2.	Ability to learn and remember verbal materials.	4.50
3.	Ability to understand verbal materials.	5.50
4.	Ability to accept personal responsibility.	6.17
5.5	Ability to make sound decisions.	6.50
5.5	Ability to maintain proficiency under emotional stress.	6.50
7.	Ability to plan and anticipate problems.	7.67
8.5	Ability to make numerical computations.	8.00
8.5	Ability to solve mechanical problems.	8.00
10.	Ability to show ingenuity.	9.00
11.	Ability to use mathematical reasoning.	9.50
12.	Ability to accurately read and record data.	10.17
13.	Ability to accept organizational responsibility.	12.50
14.	Ability to make accurate, quick, hand movements.	13.00
15.5	Ability to interpret data from records and instruments.	14.00
15.5	Ability to work effectively with others.	14.00
17.	Ability to coordinate body movements.	14.33
18.	Ability to interpret spatial patterns.	14.83
19.	Ability to meet size and strength requirements.	15.86

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Table 65

Opinions as to the Percentage of Preventive Maintenance ETs Should Do on Different Types of Equipment Expressed in Terms of Mean of the Percentages Assigned by Each Respondent Group

(General Questionnaire - Item 1)

N	Respondent Groups Design.	% of Preventive Maintenance to be Done on:							
		Radar by ETs RDs		Sonar by ETs SOs		Radio by ETs RMs		Firecontrol by ETs FCs	
71	ET	33	67	14	86	34	66	24	76
12	EMO	29	71	12*	88*	32	68	26*	74*
14	ENG.	44	56	38	62	41	59	25	75
12	EXEC.	46	54	33	67	36	64	19	81
13	OPER.	32	68	19	81	30	70	—	—
13	CIC	32	68	—	—	—	—	—	—
17	ASW	—	—	14	86	—	—	—	—
11	COMM.	—	—	—	—	37	64	—	—
10	GUN.	—	—	—	—	—	—	22	78

\* Mean percentage calculated from N-1 cases.

Table 66

Opinions as to the Percentage of Record Keeping ETs Should Do on Different Types of Equipment Expressed in Terms of the Mean of the Percentages Assigned by Each Respondent Group

(General Questionnaire - Item 1)

N	Respondent Groups Design.	% of Record Keeping to be Done on:							
		Radar by ETs RDs		Sonar by ETs SOs		Radio by ETs RMs		Firecontrol by ETs FCs	
71	ET	70	30	32	68	70	30	35	65
12	EMO	75	25	40*	60*	75	25	48*	52*
14	ENG.	68	32	48	52	63	37	26	74
12	EXEC.	54	46	26	74	50	50	40	60
13	OPER.	57	43	43	57	53	47	—	—
13	CIC	53	47	—	—	—	—	—	—
17	ASW	—	—	26	74	—	—	—	—
11	COMM.	—	—	—	—	69	31	—	—
10	GUN.	—	—	—	—	—	—	29	71

\* Mean percentage calculated from N-1 cases.

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Table 67

Opinions as to the Percentage of Corrective Maintenance ETs Should Do on Different Types of Equipment Expressed in Terms of the Mean of the Percentages Assigned By Each Respondent Group

(General Questionnaire - Item 1)

Respondent Groups N	Design. Desig.	% of Corrective Maintenance to be Done on:							
		Radar by ETs RDs		Sonar by ETs SOs		Radio by ETs RM		Firecontrol by ETs FCs	
71	ET	93	7	45*	55*	95	5	46	54
12	EMO	83	17	34*	66*	81	19	54*	46*
14	ENG.	88	12	77	23	86	14	43	57
12	EXEC.	92	8	68	32	84	16	60	40
13	OPER.	88	12	63	37	83	17	--	--
13	CIC	82	18	--	--	--	--	--	--
17	ASW	--	--	37	63	--	--	--	--
11	COMM.	--	--	--	--	85	15	--	--
10	GUN.	--	--	--	--	--	--	48	52

\* Mean percentage calculated from N-1 cases.

Table 68

Opinions as to the Percentage of Operating ETs Should Do on Different Types of Equipment Expressed in Terms of the Mean of the Percentages Assigned By Each Respondent

(General Questionnaire - Item 1)

Respondent Groups N	Design. Desig.	% of Operating That Should be Done on:							
		Radar by ETs RDs		Sonar by ETs SOs		Radio by ETs RM		Firecontrol by ETs FCs	
71	ET	1	99	1	99	1	99	5	95
12	EMO	1	99	1	99	1*	99*	5	95*
14	ENG.	1	99	1	99	1	99	1	99
12	EXEC.	2	98	0	100	2	98	2	98
13	OPER.	4	96	2	98	1	99	--	--
13	CIC	6	94	--	--	--	--	--	--
17	ASW	--	--	0	100	--	--	--	--
11	COMM	--	--	--	--	3	97	--	--
10	GUN.	--	--	--	--	--	--	12	88

\* Mean percentage calculated from N-1 cases.

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Table 69

The Percentage of Individuals in Each of Various Respondent Groups Who Favor Allowing Operators to Do Maintenance on the Inside of Electronic Equipment

(General Questionnaire - Item 2)

Respondent Groups N	Design.	Operators											
		RD			RM			SO			FC		
		% Yes	% No	% Nr	% Yes	% No	% Nr	% Yes	% No	% Nr	% Yes	% No	% Nr
71	ET	23	77	0	32	68	0	89	11	0	87	13	0
12	EMO	67	33	0	67	33	0	100	0	0	83	17	0
15	CIC	67	33	0	67	13	20	80	0	20	73	0	27
14	ASW	64	29	7	71	14	15	78	14	8	86	7	7
13	COMM.	54	23	0	85	15	0	77	0	23	69	0	31
13	OPER.	77	23	0	92	8	0	100	0	0	84	8	8
18	GUN.	17	28	55	22	22	56	33	17	50	83	11	6
12	ENG.	42	58	0	50	50	0	75	25	0	92	8	0
11	EXEC.	45	45	10	54	36	10	45	45	10	73	18	9

Table 70

The Median Percentage of Duty Time That Various Electronics Ratings Should Spend on "Non-electronic" Duties, as Stated By Various Respondent Groups

(General Questionnaire - Item 3)

Respondent Groups N	Design.	Mdn % of Duty Time That Should Be Spent on Non-electronic duties by:				
		ETs	RDs	RMs	SOs	FCs
67	ET	3 (69)*	21	11	13	10 (66)
11	EMO	10 (12)	26	23	24	30
13	CIC	8	16 (15)	9	20	11 (12)
13	ASW	9	23	22 (12)	22 (14)	24 (12)
9	COMM.	2	20	15 (12)	22	22
13	OPER.	10	16	10	16	12
8	GUN.	8	21 (7)	19 (7)	22	23 (17)
11	ENG.	9 (12)	22	20	21	15
10	EXEC.	10 (11)	28	18	28	29

\* In this table, and certain others that follow, the N's are not appropriate for all of the cells in the rows. When this is the case, the appropriate N's are presented in brackets ( ).

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Table T1

Opinions of Various Personnel Groups Concerning the Activities ET's Should be Engaged in When All the Gear is Working Expressed in Terms of the Median of the Ranks Assigned By Each Respondent Group\*

(General Questionnaire - Item 4)

Respondent Groups		Median Rank Assigned to:					
Design.	Preventive Maintenance	Work on Maintenance Records	Engage in Non-electronic Duties	Study Electronics Publications	Participate in Organized Electronics Training	Take It Easy But Remain on Call	
71	ME	1.3	2.7	5.8	3.5	2.8	5.0
11	EMO	1.4	2.4	5.2	2.3	3.2	5.7
15	CIC	1.8	3.4	5.0	3.0	1.8	5.9
14	ASW	1.1	2.9	4.8	3.5	2.4	5.8
12	COMR.	1.1	3.0	5.6	3.3	2.3	5.3
13	OPER.	1.2	2.4	5.1	3.1	2.8	5.8
16	GUN.	1.1	2.5	5.0	3.9	3.1	5.9
12	ENG.	1.4	2.1	5.1	3.8	2.8	5.9
11	REC.	1.4	3.3	4.9	3.4	1.6	6.0

- Most important activity was ranked 1; least important was ranked 6.

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Table 72

Opinions as to Whether ETs or RMs Should be Responsible for Calibrating and Maintaining Crystal Controlled Radio Frequencies Expressed in Terms of the Percentage of Each Respondent Group Selecting a Given Response

(General Questionnaire - Item 5)

Respondent Groups N	Designation	% Favoring ETs	% Favoring RMs	% Giving No Response
71	ET	66	34	0
12	EMO	42	50	8
15	CIC	33	47	20
14	ASW	42	29	29
13	COMI.	54	38	8
13	OPER.	38	62	0
18	GUN.	28	17	55
12	ENG.	42	50	8
11	EXEC.	46	36	18

Table 73

Opinions as to Whether ETs or RMs Should Be Responsible for Calibrating and Maintaining Non-crystal Controlled (BFO) Radio Frequencies Expressed in Terms of the Percentage of Each Respondent Group Expressing a Given Response

(General Questionnaire - Item 6)

Respondent Groups N	Designation	% Favoring ETs	% Favoring RMs	% Giving No Response
71	ET	42	58	0
12	EMO	25	75	0
15	CIC	20	60	20
14	ASW	29	42	29
13	COMI.	23	69	8
13	OPER.	8	92	0
18	GUN.	5	28	67
12	ENG.	33	50	17
11	EXEC.	9	73	18

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Table 74

Opinions Concerning What an Operator Should Do When His Gear Has Broken Down Expressed in Terms of the Percentage of Each Respondent Group Selecting a Given Response

(General Questionnaire - Item 7)

Respondent Groups N Desig.		% Favoring That the Operators:				% Giving No Response
		Attempt to Repair the Gear Himself	Be Free Until the Gear is Fixed	Perform Non-Electronic Duties		
71	ET	80	1	10	6	3
12	EMO	75	8	17	0	0
15	CIC	87	13	0	0	0
14	ASW	79	14	7	0	0
13	COMI.	100	0	0	0	0
13	OPER.	85	15	0	0	0
18	GUN.	83	6	5	0	6
12	ENG.	100	0	0	0	0
11	EXEC.	100	0	0	0	0

Table 75

Opinions as to the Part the Electronics Materiel Officer Should Play in Tuning and Maintenance Operations Expressed in Terms of the Percentage of a Respondent Group Favoring an Activity

(General Questionnaire - Item 8)

Respondent Groups N Designation		% Favoring the EMO Handle Equipment	% Favoring the EMO Supervise But Not Handle Equipment	% Giving No Response
71	ET	3	94	3
12	EMO	8	84	8
15	CIC	0	87	13
14	ASW	0	79	21
13	COMI.	15	85	0
13	OPER.	0	100	0
18	GUN.	0	83	17
12	ENG.	0	92	8
11	EXEC.	9	91	0

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Table 76

Opinions Concerning the Most and Least Serious Problems Facing an Electronics Technician  
Expressed in Terms of the Percentage of a Respondent Group Selecting a Given Response

(General Questionnaire - Item 9 )

Respondent Groups		Problems														
		Inadequate Electronics Training	Too Few ET's Per Ship	Operators Fouling the Gear	No Elect. Repair Shop	Inadequate Tools & Equipment	Lack of Spare Parts	MR	NR	NR Both	MR	NR	NR Both			
M	L	M	L	M	L	M	L	M	L	M	L	M	L			
71	ET	24	10	4	25	11	21	7	11	28	3	14	21	12	8	0
72	ETO	50	8	8	17	8	17	0	17	25	0	0	42	9	0	0
75	CIC	13	27	46	0	7	0	0	0	33	7	13	0	7	20	22
74	ASW	21	21	29	0	0	36	0	14	7	14	14	0	0	0	22
73	COM.	31	0	31	8	0	23	0	8	8	8	31	0	0	0	22
73	OPER.	8	8	45	0	0	38	0	8	8	8	8	0	0	0	23
78	GUN.	6	6	6	0	17	0	6	6	6	6	6	21	0	0	38
72	ENG.	17	25	8	25	0	24	0	17	0	17	8	0	0	0	17
71	EXEC.	54	0	27	18	9	0	27	9	18	0	18	0	0	0	10

M represents the percentage of a respondent group designating the problem as the most serious, and L represents the percentage designating the problem as the least serious.

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Table 77

Opinions as to Whether or Not an Electronics Workshop is Essential on Destroyers and on Destroyer Escorts Expressed in Terms of the Percentage of a Respondent Group Selecting a Given Response

(General Questionnaire - Item 10)

Respondent Groups N	Designation	Workshop Essential on DD			Workshop Essential on DE			% NR Both Items
		% Yes	% No	% NR	% Yes	% No	% NR	
71	ET	92	8	0	83	10	7	0
12	EMO	100	0	0	58	0	42	0
15	CIC	93	7	0	67	20	13	0
14	ASW	50	36	7	43	0	50	7
13	COMM.	69	15	0	46	15	23	16
13	OPER.	77	23	0	38	16	46	0
18	GUN.	50	11	0	33	0	28	39
12	ENG.	75	9	8	42	8	42	8
11	EXEC.	54	18	18	45	9	36	10

Table 78

Opinions Concerning What the Chief Function of an Electronics Workshop Should Be Expressed in Terms of the Percentage of a Respondent Group Selecting a Given Response

(General Questionnaire - Item 11)

Respondent Groups N	Design.	% Selecting the Chief Function of a Workshop to Be a:				% Giving No Response
		Hdqtrs. for ETs	Place to Work on Broken Gear	Store for Test Equip., Tubes, etc.	Place to Stand ET Watches	
71	ET	8	52	32	0	8
12	EMO	9	33	58	0	0
15	CIC	7	27	46	0	20
14	ASW	0	21	64	0	15
13	COMM.	0	23	69	0	8
13	OPER.	15	62	15	0	8
18	GUN.	6	22	50	0	22
12	ENG.	0	33	50	0	17
11	EXEC.	10	45	45	0	0

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Table 79

Opinions Concerning the Adequacy of Tools Available to ETs Expressed in Terms of the Percentage of a Respondent Group Selecting Each Alternative

(General Questionnaire - Item 12)

Respondent Groups N Designation		Quantity Adequate			Quality Adequate			%NR Both Items
		%Yes	%No	%NR	%Yes	%No	%NR	
71	ET	41	59	0	84	13	3	0
12	EMO	25	75	0	83	17	0	0
15	CIC	53	14	0	53	7	7	33
14	ASW	57	14	0	50	7	14	29
13	COMI.	61	8	0	69	0	0	31
13	OPER.	46	38	8	69	15	8	8
18	GUN.	28	17	0	39	6	0	55
12	ENG.	83	8	0	83	8	0	9
11	EXEC.	45	37	0	64	18	0	18

Table 80

Opinions Concerning the Adequacy of Test Equipment Available to ETs Expressed in Terms of the Percentage of a Respondent Group Selecting Each Alternative

(General Questionnaire - Item 13)

Respondent Groups N Designation		Quantity Adequate			Quality Adequate			%NR Both Items
		%Yes	%No	%NR	%Yes	%No	%NR	
71	ET	49	51	0	79	20	1	0
12	EMO	25	75	0	67	33	0	0
15	CIC	53	7	0	53	7	0	40
14	ASW	28	43	0	36	28	7	29
13	COMI.	46	23	0	54	15	0	31
13	OPER.	38	46	0	69	15	0	16
18	GUN.	22	22	0	22	17	5	56
12	ENG.	75	17	0	67	17	8	8
11	EXEC.	27	45	9	54	18	9	19

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Table 81

Opinions Concerning Per Cent Duty Time Various Electronic Ratings Should Spend on Preventive Maintenance Expressed in Terms of the Median of the Percentages Assigned By Each Respondent Group

(General Questionnaire - Item 14)

Respondent Group		Median % of Duty Time That Should Be Spent on Preventive Maintenance By:		
N	Desig.	ETs	SOs	RDs
69	ET.	15 (70)*	23	22
12	EMO	22 (11)	20	19
12	CIC	22	26 (11)	21 (13)
11	ASW	21	12 (13)	11
9	COMI.	45 (10)	25	20
12	OPER.	22	26	24
7	GUN.	26	18	18
12	ENG.	49	27	24
10	EXEC.	50	20	20

\* Numbers in brackets indicate where N differs from that given in the left-hand column of the table.

Table 82

Opinions as to Whether There Should be One ET Trained Solely for Preventive Maintenance. Expressed in Terms of the Percentage of a Respondent Group Selecting a Given Alternative

(General Questionnaire - Item 15)

Respondent Groups		ET for Preventive Maintenance		
N	Designation	% Yes	% No	% No Response
71	ET	6	94	0
12	EMO	0	100	0
15	CIC	33	67	0
14	ASW	7	79	14
13	COMI.	8	84	8
13	OPER.	31	54	15
18	GUN.	11	67	22
12	ENG.	8	92	0
11	EXEC.	18	73	9

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Table 83

Frequency With Which Various Respondent Groups Say That Certain Electronics Ratings Should Be Combined\*

(General Questionnaire - Item 16)

Respondent Groups N	Design. Desig.	Listed Combinations of Ratings					Combination of Ratings Added by the Respondents						Freq. of No Resp.
		ET- FT	ET- RD	FT- FC	RD- FC	RM- ET	ET- YN	RD- SO	RM- TM	SO- ET	SO- FT	None	
		FT	RD	FC	FC	ET	YN	SO	TM	ET	FT	None	
71	ET	34	2	40	2	4	0	0	0	2	0	4	10
12	EMO	6	0	4	1	0	1	0	0	0	0	1	2
15	CIC	5	0	6	1	1	0	0	0	0	0	3	4
14	ASW	1	1	3	0	1	0	1	0	1	0	2	7
13	COIM.	3	2	4	2	3	0	0	1	1	0	1	4
13	OPER.	2	1	4	1	2	0	0	0	0	1	4	2
18	GUN.	5	0	11	0	1	0	0	0	0	0	1	1
12	ENG.	4	1	4	0	0	0	0	0	0	0	0	7
11	EXEC.	0	2	5	0	0	0	1	0	0	0	0	5

\* Respondents not limited to one selection.

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Median Ranks of Some of the Characteristics Which an Electronics Technician Should Possess, Obtained From the Rankings Assigned By the Individuals of Each of a Number of Respondent Groups\*

(General Questionnaire - Item 17)

Table 84

Respondent Groups		Characteristics								
R	Desig.	High CCT Score	Above Avg. Physical Coordination	High Interest in Electronics	Above Avg. Stamina	Ability to Withstand Fatigue	Pleasant Personality	Takes Direction Well	Hard Worker	Initiative
11	ET	4.1	6.0	1.2	8.1	7.5	7.0	4.8	3.7	2.2
12	EMO	3.1	7.2	1.2	8.0	7.9	6.2	5.5	3.6	2.3
13	CIC	2.7	6.4	1.2	7.8	6.0	8.1	5.9	3.8	2.4
12	ASV	3.8	6.0	1.4	7.8	8.0	7.2	5.5	2.9	3.8
11	COMB.	2.0	6.8	1.3	8.0	6.0	8.2	5.9	3.8	3.2
13	OPER.	2.1	4.7	1.3	7.3	6.7	8.1	6.0	4.8	3.8
13	GUN.	3.0	6.0	1.2	7.7	7.2	8.7	5.2	4.2	2.3
11	ENG.	3.2	6.9	1.4	7.2	8.3	8.0	5.0	3.7	2.0
10	EXEC.	3.0	6.2	1.3	7.0	7.0	8.5	5.5	3.5	2.8

\* Most important characteristic was ranked 1, least important was ranked 9.

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Table 85

Median Percentage of Work Time That an Electronics Technician Should Spend Keeping Records According to Given Respondent Group

(General Questionnaire - Item 18)

Respondent Groups		% of Work Time ETs Should Spend Keeping Records
N	Desig.	
69	ET	10
12	EMO	12
12	CIC	12
10	ASW	15
10	COIN.	9
11	OPER.	11
9	GUN.	11
10	ENG.	12
10	EXEC.	10

Table 86

Decisions on Whether Electronics Technicians Use Equipment Records in Trouble Shooting Expressed in Terms of the Percentage of a Respondent Group Selecting a Given Alternative

(General Questionnaire - Item 19)

Respondent Groups		Records Used in Trouble Shooting		
N	Desig.	% Yes	% No	% No Response
71	ET	87	11	2
12	EMO	83	17	0
15	CIC	40	13	47
14	ASW	36	0	64
13	COIN.	38	24	38
13	OPER.	46	23	31
18	GUN.	22	6	72
12	ENG.	58	17	25
11	EXEC.	54	10	36

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Table 87

Opinions Concerning the Ways in Which ETs Use Equipment Records in Trouble Shooting Expressed in Terms of the Number of Opinions Given By Each Respondent Group

(General Questionnaire - Item 19)

Categories of Uses of Equipment Records in Trouble Shooting	Respondant Groups									Total
	ET N=71	ENO N=12	CIC N=15	ASW N=14	COM. N=13	OPER. N=13	GUN. N=18	ENG. N=12	EXEC. N=11	
To Reference in Locating Similar Troubles	12	7	3	1	0	3	3	3	2	34
To Ascertain Possible Cause to Use as Starting Point in T-S	12	2	1	3	4	3	0	0	2	27
No Attempt to Fix a Reason or Pattern for Breakdown	9	1	1	1	1	0	1	1	1	16
No Check Past Performance and Condition of Components	6	0	0	0	0	0	0	2	3	11
No Determine Past Optimum Performance	0	0	0	1	0	1	0	0	0	2
Are Not Used in Trouble Shooting	2	0	1	0	0	2	1	0	1	7
No Response	30	2	9	8	8	4	11	5	5	82

Table 88

Opinions Concerning Prerequisites for Class B Electronics Training Expressed in Terms of the Percentage  
of a Respondent Group Selecting a Given Response

(General Questionnaire - Item 20)

Respondent Groups		Prerequisites for Class B Electronics Training																% Giving No Response				% Giving No Response				Prerequisites for Class B Electronics Training								
N	Design.	Regular Navy				Lengthy Sea Duty				Lengthy Combat Experience				Strong Interest in Electronics				High, Class A School Grades				Good Electronics Perform. Record				Good Petty Officer Qualities				High GCT Score				
		M	L*	M	L	M	L	M	L	M	L	M	L	M	L	M	L	M	L	M	L	M	L	M	L	M	L	M	L	M	L			
71	ET	4	20	1	20	0	24	42	0	0	11	37	0	1	4	1	6	14	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12	EEC	8	8	0	0	42	0	33	0	0	8	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
15	CIC	7	33	0	27	0	13	39	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
14	ASW	0	21	0	29	0	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
13	CORPL.	8	8	0	0	15	0	54	23	0	8	0	0	8	8	8	8	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	OPER.	0	0	0	23	0	0	31	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
18	GUN.	0	6	0	28	0	0	38	22	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12	EEC.	0	33	0	25	0	8	42	0	0	17	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11	EXEC.	0	36	0	9	0	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

\* K represents the percentage of a respondent group designating the prerequisite as most important, and L represents the percentage designating the prerequisite as least important.

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Table 89

Decisions as to the Adequacy and Availability of Electronics Publications  
to ETs Expressed in Terms of the Percentage of a Respondent Group Se-  
lecting a Given Alternative

(General Questionnaire - Item 21)

Respondent Groups N	Designation	Publications Adequate			Publications Available		
		% Yes	% No	% NR	% Yes	% No	% NR
71	ET	79	20	1	90	8	2
12	EMO	92	8	0	92	8	0
15	CIC	60	7	33	67	0	33
14	ASW	43	0	57	50	0	50
13	COMM.	54	0	46	61	8	31
13	OPER.	54	8	38	69	0	31
18	GUN.	22	6	72	33	6	61
12	ENG.	92	0	8	92	0	8
11	EXEC.	55	9	36	73	0	27

Table 90

Opinions Concerning the Major Use of Electronics Publications Expressed in  
Terms of the Number of Opinions for Each Respondent Group

(General Questionnaire - Item 22)

Respondents		Training & Information	Reference for Trouble Shooting	Reference for Maint. & Operating of Equip.	Keep up on New Developments	NR
N	Designation					
71	ET	16	13	10	17	15
12	EMO	4	4	3	0	1
15	CIC	7	1	0	3	4
14	ASW	3	3	1	0	7
13	COMM.	5	0	1	0	7
13	OPER.	6	2	0	1	4
18	GUN.	3	1	1	0	13
12	ENG.	5	2	1	2	2
11	EXEC.	2	2	1	1	5

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Table 91

Opinions Concerning the Most Important Limitations to the Use of Electronics Publications Expressed in Terms of the Number of Opinions for Each Respondent Group

(General Questionnaire - Item 23)

Categories of Limitations in the Use of Publications	Respondent Groups									Total
	ET N=71	EIO N=12	CIC N=15	ASW N=14	COM. N=13	OPER. N=13	GUN. N=18	ENG. N=12	EXEC. N=11	
Too Highly Technical	6	1	5	0	2	2	1	2	1	20
Not Detailed Enough	15	5	0	1	1	2	1	1	2	28
Too Limited in Application (Limitations as to Availability, Size & Space)	4	0	1	0	2	1	0	1	0	9
Too Time Consuming to Keep Up on Them	0	1	0	0	1	0	1	0	0	3
Uninteresting	9	3	1	0	1	1	0	1	1	17
Security Classification Problems	0	1	0	1	0	0	1	1	0	4
No Limitations	4	1	0	0	0	1	0	0	2	3
Not Kept Up to Date	5	0	1	0	0	0	0	0	0	6
Lack of Publications	0	0	1	0	0	0	0	0	0	1
Inadequate Indexing	10	0	0	0	0	0	0	0	0	10
No Response	18	0	6	12	5	6	14	6	5	72

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Table 92

Opinions as to Whether Electronics Technicians are Adequately Trained When They Leave School Expressed in Terms of the Percentage of a Respondent Group Selecting a Given Alternative

(General Questionnaire - Item 24)

N	Respondent Groups Designation	Training Adequate		
		%Yes	%No	%NR
71	ET	14	82	4
12	EO	42	58	0
15	CIC	47	33	20
14	ASW	50	21	29
13	COM.	23	54	23
13	OPER.	54	31	15
18	GUN.	6	44	50
12	ENG.	25	42	33
11	EXEC.	36	36	28

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Table 93  
Opinions Concerning the Deficiencies That Electronic Technicians Display on Leaving ET School Expressed  
In Terms of the Number of Opinions Given By Each Respondent Group.

(General Questionnaire - Item 24)

Categories of Deficiencies of ETs	Respondent Groups									Total
	ET N=71	MO N=12	CIC N=15	ASV N=14	COMM. N=13	OPER. N=13	GUN. N=18	ENG. N=12	EXEC. N=11	
Lack Experience	31	2	2	6	4	3	6	3	4	61
Lack Knowledge of Specific Equip.	8	0	1	0	1	0	1	0	1	12
Lack Training	0	0	1	0	0	0	0	2	0	3
Lack Ability to Make Repairs	11	1	0	0	1	0	0	0	0	13
Lack Practical Knowledge	2	1	0	0	0	1	0	0	0	4
Lack Knowledge of Importance of Records and Preventive Maintenance	0	1	0	0	0	0	0	0	0	1
Lack Theory	3	1	0	0	0	0	0	0	0	4
Lack Desire to Be in Electronics	0	1	0	0	0	0	0	0	1	1
Lack Knowledge of Sonar	0	0	0	0	1	1	0	0	2	2
Lack Confidence in Their Work	0	1	0	0	0	0	0	0	1	1
Lack an Overall View (Too Specifically Trained)	2	1	0	0	0	0	0	0	3	3
Lack Knowledge of Trouble Shooting	4	0	0	0	0	1	0	0	5	5
No Response	10	3	11	8	6	9	10	7	6	70

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Table 94

Opinions Concerning the Minimum Amount of Sea Duty a Man Should Have Before Attending Class A Electronics School Expressed in Terms of the Percentage of Each Respondent Group Selecting a Given Response

(General Questionnaire - Item 25)

Respondent Groups		% Stating					% Giving No Response
N	Designation	None	3 Mons.	6 Mons.	1 Yr	2 Yrs	
71	ET	44	17	32	4	0	3
12	EMO	50	25	25	0	0	0
15	CIC	20	20	27	13	0	20
14	ASW	21	7	29	7	0	36
13	COMM.	15	8	38	23	8	8
13	OPER.	8	8	30	54	0	0
18	GUN.	17	11	22	17	0	33
12	ENG.	25	0	50	25	0	0
11	EXEC.	18	9	46	18	9	0

Table 95

Opinions Concerning Whether ET Training Should Be Given Only to Regular Navy Men Expressed in Terms of the Percentage of a Respondent Group Selecting a Given Alternative  
(General Questionnaire - Item 26)

Respondent Groups		ET Training Only for Regular Navy Men		
N	Designation	% Yes	% No	% N.R.
71	ET	30	67	3
12	EO.	8	92	0
15	CIC	7	86	7
14	ASW	7	79	14
13	COMM.	23	77	0
13	OPER.	8	92	0
18	GUN.	6	72	22
12	ENG.	17	83	0
11	EXEC.	9	91	0

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Table 96

Estimates of Whether Electronic Equipment is Regularly Inspected By the Electronics Materiel Officers Expressed in Terms of the Percentage of Each Respondent Group Selecting a Given Alternative

(General Questionnaire - Item 27)

N <sup>a</sup>	Respondent Groups Designation	EMO Makes Equipment Inspections		
		% Yes	% No	% No
71	ET	42	55	3
12	EMO	50	50	0
15	CIC	14	33	53
14	ASW	14	29	57
13	COMM	31	15	54
13	OPER	31	31	38
18	GUN	22	17	61
12	ENG	42	41	17
11	EXEC	36	28	36

Table 97

Estimates of the Frequency With Which Electronic Materiel Officers Make Equipment Inspections Expressed in Terms of the Total Number of Individuals in Each Respondent Group Who Chose a Given Frequency

(General Questionnaire - Item 27)

N <sup>a</sup>	Respondent Groups Designation	Frequency of Inspections by EMO					
		Weekly	Bi-weekly	Monthly	Quarterly	Infrequent	Not Specified
30	ET	14	9	3	2	1	1
6	EMO	5	0	0	0	0	1
2	CIC	2	0	0	0	0	0
2	ASW	1	0	0	0	0	1
4	COMM	2	1	0	0	0	1
4	OPER	2	0	1	0	0	1
4	GUN	1	0	0	1	0	2
5	ENG	3	0	2	0	0	0
4	EXEC	3	0	0	0	0	1

N represents the number of respondents who answered "Yes" in Table 33 and were thus qualified to answer this part of the item.

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General Questionnaire Item Number 28 asked for the job title of the person who prepared the electronics maintenance schedule. The responses in terms of the 18 ships were as follows:

On 9 ships the lead ET prepared it.  
On 5 ships the EMO prepared it.  
On 3 ships the EMO and the lead ET prepared it cooperatively.  
On 1 ship no maintenance schedule was employed.

Table 98

Opinions as to the Most Frequent Contributor to Excessive Shutdown Time of Electronic Gear Expressed in Terms of the Median of the Ranks Assigned By the Members of a Respondent Group\*

(General Questionnaire - Item 29)

		Median Rank Assigned to:				
Respondent Group N	Desig.	Insufficient Preventive Maintenance	Spare Parts Difficulties	Poor Coordination Between Ship's Dept.	Inexperienced Personnel	Carelessness of Personnel
69	ET	2.8	2.3	4.0	2.7	3.2
12	EMO	1.5	4.0	3.5	2.2	3.5
13	CIC	1.9	2.6	4.8	2.6	3.9
9	ASW	1.7	3.0	4.8	2.2	3.2
12	COMM	2.2	3.5	4.2	1.8	3.5
7	OPER	1.75 (8)**	1.5 (8)**	4.4	2.3	4.6
10	GUN	1.2	3.8	4.7	2.3	2.5
11	ENG	1.2	4.2	4.2	3.0	2.8
10	EXEC	1.9	2.0	4.8	2.8	4.0

\* Most frequent contributor was ranked 1; least frequent was ranked 6.

\*\* N as indicated in parentheses.

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Table 99

Opinions Concerning the Types of Training That Would Be Most Effective for a Man Just Out of Class A Electronics School Expressed in Terms of the Median of the Ranks Assigned By the Members of a Respondent Group\*

(General Questionnaire - Item 30)

Respondent Group N   Desig.		Median Ranks Assigned to:			
		Organized Training	Informal Individual Training	Individual Tutoring	Unscheduled Training Sessions
69	ET	2.8	3.4	1.2	2.6
12	EMO	3.0	3.5	1.2	2.8
13	CIC	3.0	2.8	1.0	3.1
10	ASW	2.5	3.1	1.1	3.0
13	COMK	3.0	3.6	1.0	2.7
11	OPER	2.4	3.7	1.1	3.0
13	GUN	2.4	3.6	1.1	2.9
12	ENG	2.2	3.5	1.5	3.0
11	EXEC	2.1	3.3	1.3	3.4

\* Most effective type of training was ranked 1; least effective ranked 4.

Table 100

Opinions Concerning the Main Value of Group Shipboard Training Expressed in Terms of the Percentage of a Respondent Group Selecting a Given Response

(General Questionnaire - Item 31)

Respondent Group N   Desig.		% Stating the Main Value of Shipboard Training is That:			Giving No Response
		Keeps Men Busy	Teaches Specific Gear	Gives Needed Practical Education	
71	ET	7	27	62	4
12	EMO	0	42	58	0
15	CIC	0	13	60	27
14	ASW	7	22	50	21
13	COMK	0	46	54	0
13	OPER	0	31	54	15
18	GUN	0	22	56	22
12	ENG	0	25	75	0
11	EXEC	0	36	64	0

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Table 101

Opinions Concerning Drawbacks to Group Shipboard Training Expressed in Terms of the Number of Members in a Respondent Group Selecting a Given Response\*

(General Questionnaire - Item 32)

Respondent Group N	Design.	Drawbacks to Group Shipboard Training						No R e. p.
		No Room for Group Training	No Competent Teacher	People Too Busy for Group Training	Informal Non-Group Training Better	All Men Cannot Meet At One Time	Differing Amounts of Knowl.	
71	ET	23	11	26	17	36	31	4
12	EMO	0	3	5	4	3	5	0
15	CIC	2	2	6	1	6	4	2
14	ASW	2	2	2	3	2	2	6
13	COM	4	4	8	1	4	4	0
13	OPER	0	1	9	0	3	2	3
18	GUN	6	2	6	2	7	4	6
12	ENG	3	1	6	0	3	4	2
11	EXEC	3	0	3	1	2	4	2

More than one selection was permitted.

Table 102

The Number of Ships on Which ETs Specialize on Equipment Maintenance and the Frequency of Rotation of Duties

(General Questionnaire - Item 33)

Specialization and Frequency of Rotation of ETs	Number of Ships
Do not specialize	11
Specialize but do not rotate duties	4
Specialize and rotate duties quarterly	2
Specialize and rotate duties every six months	1

\* Specialization refers to situations in which each ET is assigned the responsibility of maintaining particular equipment but his work is not necessarily restricted to this equipment.

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Table 103

Abstracted Answers to Interview Question Concerning Future Plans for ETs,  
EMOs, and CIC Officers\*

Item	Future Plans	ET	EMO	CIC
a.	Will remain in Navy until retirement.	4	3	0
b.	Will leave Navy to go to school in electronics or electrical engineering.	23	0	0
c.	Will leave Navy to go to school in non-electronics (includes science and physics).	7	1	1
d.	Will leave Navy to work in electronics or electricity.	11	3	1
e.	Will leave Navy to work in non-electronics.	1	1	5
f.	Will leave Navy but undecided what to do.	3	2	1
g.	Will leave Navy to go to unspecified school.	2	0	0
h.	Undecided whether to leave or stay.	3	0	2
	Total N	54	10	10

\* In terms of frequency of response.

Table 104

Abstracted Answers to Interview Question Concerning Best Job ETs Have Had in Navy\*

Item	Jobs	Freq.
a.	This is only job.	16
b.	School.	12
c.	Present Job.	8
d.	Electronics at shore school.	8
e.	Electronics in general.	4
f.	Radar.	2
g.	Submarine electronics.	2
h.	Communications in general.	1
i.	Frigate.	1
	Total N	54

\* In terms of frequency of response.

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Table 105

Abstracted Answers to Interview Question Concerning Best Sea Duty ETs Have Had in Navy\*

Item	Duties	Freq.
a.	This is only sea duty.	34
b.	Present sea duty.	7
c.	Submarine.	3
d.	First trip overseas.	2
e.	Destroyer.	2
f.	Frigate.	1
g.	Tanker.	1
h.	Carrier.	1
i.	Electronics.	1
j.	No answer.	2
Total N		54

\* In terms of frequency of response.

Table 106

Abstracted Answers to Interview Question Concerning Jobs to Which ETs Would Change, If Possible\*

Item	Jobs	Freq.
a.	Wouldn't change jobs.	47
b.	Would change to guided missiles.	2
c.	Would change to Yeoman.	2
d.	Would change to Chief Accountant.	1
e.	Would change to RD or SO.	1
f.	Would change to AT (Aircraft elect. tech.).	1
g.	Would change to teletype maintenance.	1
h.	Undecided.	1
Total N		56

\* In terms of frequency of response.

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Table 107

Abstracted Answers to Interview Question Concerning Duties ETs Are Best Prepared to Perform\*

Item	Duties	Freq.
a.	General ET duties.	25
b.	Corrective maintenance and trouble shooting.	7
c.	Communications repair and maintenance.	7
d.	Radar repair and trouble shooting.	5
e.	Corrective and preventive maintenance.	2
f.	Record keeping.	1
g.	Preventive maintenance.	1
h.	TBL and Mark 34.	1
	Total N	49

Table 108

Abstracted Answers to Interview Question Concerning Unreasonable Maintenance Demands Made of ETs\*  
N = 55\*\*

Item	Unreasonable Demands	Freq.
a.	No unreasonable demands.	37
b.	Officers demand repair sooner than it can be done.	6
c.	Officers lack knowledge of equipment.	3
d.	Officers call ETs to make adjustments that officer or operator can make.	2
e.	Officers expect more from equipment than it is capable of giving.	2
f.	ET required to do all preventive maintenance that operator should do.	2
g.	Officers do not understand ET repair problems.	2
h.	Officer demands time estimate for fixing gear before ET can make diagnosis.	1
i.	Having to maintain obsolete gear.	1
j.	Having to work under EMO who doesn't know any electronics.	1
k.	Having to drop complicated jobs to take care of unimportant duties.	1
l.	Having EMO stand over ET asking frequently what is wrong with gear.	1
m.	Red tape - having to secure OD permission to shut down equipment that isn't working already.	1
n.	Drills interfere with maintenance work and cause ETs to work at night.	1
o.	Safety precautions - 2 men on gear when not enough ETs, and must wear safety belt when climbing mast.	1

\* In terms of frequency of response.

\*\* For this item, there may be more than one answer for each respondent. Therefore, the N of the responses will not equal the N of the respondents.

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Table 109

Abstracted Answers to Interview Question Concerning Other Jobs ETs Can Perform  
Besides Their Present Job\*

N = 42\*\*

Item	Jobs	Freq.
a.	None	29
b.	Radarman	7
c.	Radioman	5
d.	Electrician	3
e.	Gunnery	2
f.	Sonarman	2
g.	Firecontrol technician	1
h.	Storekeeper	1
i.	Yeoman	1
j.	Truck driver	1
k.	Ship fitter	1
l.	Master-at-arms	1
m.	Engine room	1
n.	Machine shop	1
o.	Wood molding	1

\* In terms of frequency of response.

\*\* For this question there may be more than one answer for each respondent. Therefore, the N of the responses will not equal the N of the respondents.

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Table 110

Abstracted Answers to Interview Question Concerning Factors Which Stand in the Way of ETs Doing a Better Job\*  
N = 56\*\*

Item	Factors	Freq.
a.	Lack of proper tools.	11
b.	Inadequate test equipment.	11
c.	Lack of experience.	10
d.	Crowded work space.	6
e.	Lack of schooling in particular types of gear.	5
f.	No factors standing in the way.	5
g.	Inability to get equipment secured to work on it while at sea.	5
h.	Lack of shop facilities.	5
i.	Lack of theory in training (went too fast in school).	3
j.	Inability to get further schooling (Class B and special schools).	3
k.	Distance of workshop from electronic gear.	3
l.	Lack of class A school training.	3
m.	Lack of incentive (Poor officer supervision).	3
n.	Slowness in procuring ordered spare parts.	3
o.	Lack of spare parts.	2
p.	Lack of trained personnel due to complements being filled with low rated men.	2
q.	Lack of spare parts stowage space.	2
r.	Interruptions during work on one gear to work on another.	1
s.	Living conditions.	1
t.	Refused to answer.	1
u.	Lack of power supply in shop to test receivers.	1
v.	Lack of reference data.	1
w.	Defective spare parts.	1
x.	Poor instructions issued with test equipment.	1
y.	Lack of time and availability of personnel to hold ship-board training.	1
z.	Personal laziness.	1
aa.	Too much record keeping.	1
bb.	Standing watches other than electronics.	1
cc.	Inefficient record keeping of previous ET personnel.	1

\* In terms of frequency of response.

\*\* For this item, there may be more than one answer for each respondent. Therefore, the N of responses will not equal the N of respondents.

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Table III

Abstracted Answers to Interview Questions Concerning Things Which Can Be Done  
to Attract and Hold Capable ETs in the Navy\*  
N = 55\*\*

Note: The ETs almost unanimously indicated that nothing can be done to attract and hold capable ETs in the Navy. The following responses are suggestions they had for improving the situation when pressed for an answer by the interviewer.

Item	Suggested Improvements	Freq.
a.	Make certain that men spend as much time at shore base as at sea. This is promised but not done.	5
b.	More pay (pay should be equivalent to same job in civilian life).	5
c.	Eliminate watches and duties outside of electronics work (mess duty, etc.)	4
d.	Put ETs in own division.	2
e.	Better treatment of ETs (make ETs similar to civilian technician).	2
f.	Give ETs shore duty for entire enlistment if they want it.	2
g.	Choose ETs for stability rather than high GCT.	2
h.	Make two classes of ETs. One class, highly trained and commissioned; the other, little training to do routine.	2
i.	Make ET enlistment longer.	2
j.	Make ET specifications higher.	1
k.	Make ET a warrant rate right from beginning.	1
l.	Give married men shore duty.	1
m.	Decrease time required to get rate advancements.	1
n.	Stop limiting advanced schooling to men with long obligated time.	1
o.	Provide enough tools and test equipment.	1
p.	Send men to sea before sending them to school.	1
q.	Better living conditions.	1
r.	Give a more realistic picture in school of ET's job in fleet.	1
s.	Send more men to school from ships.	1
t.	Make all ETs 1st class or above.	1
u.	Give higher rate if ETs ship over.	1
v.	Draft ETs.	1
w.	Allow Captain to advance rate as well as by tests.	1
x.	Allow men in electronics only if they really want it.	1
y.	Stop training ETs so they will be valuable outside Navy.	1
z.	Pick men for ETs who are willing to make career of Navy.	1
aa.	Improve general officer caliber.	1
bb.	Train officers to understand ET problems.	1
cc.	Make officers better leaders.	1
dd.	Let men make definite plans as to shore duty and school.	1

\* In terms of frequency of response. For this item, there may be more than 1 answer for each respondent. The N of responses will not = N of respondents.

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Table 112

Abstracted Answers to Interview Question Concerning Primary Duties of ENOs\*

Item	Primary Duties	Freq.
a.	Electronics officer	7
b.	Electronics officer and electrical officer.	2
c.	Damage control officer.	1
d.	Electrical officer.	1
	Total N	11

In terms of frequency of response.

Table 113

Abstracted Answers to Interview Question Concerning Secondary Duties of ENOs\*  
N = 11\*\*

Item	Secondary Duties	Freq.
a.	Electronics officer.	2
b.	Electrical officer.	2
c.	Legal officer.	1
d.	Mess caterer.	1
e.	Deck watch officer.	1
f.	Investigating officer.	1
g.	Assistant engineering officer.	1
h.	Library officer.	1
i.	Assistant to the assistant engineering officer.	1
j.	Assistant to the operations officer.	1
k.	Coding board.	1
l.	Court-marshall board.	1
m.	CIC watch officer.	1

In terms of frequency of response.

\*\* For this question, there may be more than one answer for each respondent. Therefore, the N of the responses will not equal the N of respondents.

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Table 114

Abstracted Answers to Interview Question Asked of EMOs Concerning Whether ETs Specialize on Certain Pieces of Gear and If They Rotate Jobs\*  
N = 11

Item	Will rotate at discretion of EMO	Will not rotate
a. Do specialize	1	1
b. Do not specialize	0	9

\* In terms of frequency of response.

Table 115

Abstracted Answers to Interview Question Asked of EMOs Concerning Those Things That More Than Anything Else Stand in the Way of Their Doing a Better Job\*  
N = 11\*\*

Item	Interfering Factors	Freq.
a.	"Short-timers" attitude.	3
b.	Lack of proper test equipment.	3
c.	Too much paper work.	2
d.	Lack of well trained ETs.	2
e.	Lack of interest by others (officers and men) in preventive maintenance.	2
f.	ETs doing non-electronic duties (such as mess duty, watches outside electronics, etc.)	2
g.	Own inexperience.	2
h.	Difficulty in obtaining spare parts.	2
i.	Lack of time to work with ETs.	2
j.	Lack of tools.	1
k.	Lack of cooperation between departments.	1
l.	Lack of work shop.	1
m.	By-passing in chain of command.	1
n.	Poorly trained radiomen.	1
o.	Poorly trained radarmen.	1
p.	Insufficient number of personnel.	1
q.	Operators' failure to report equipment malfunctions.	1
r.	Unclear delineation of EMO duties.	1
s.	Lack of knowledge of other officers as to EMO's duties.	1
t.	ETs in wrong department (are in Eng. but should be Oper.)	1
u.	Overlap between SOs and ETs making repairs.	1
v.	Poorly designed equipment.	1

\* In terms of frequency of response.

\*\* For this item, there may be more than one answer for each respondent. Therefore, the N of the responses will not equal the N of the respondents.

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Table 116

Abstracted Answers to Interview Question Asked of EMOS Concerning the Relationship Between the EMO and the CIC Officer\*

N = 9\*\*

Item	Relationship	Freq.
a.	No conflict.	5
b.	Electronics should be in operations department.	2
c.	Small conflict as to who should do cleaning for inspection.	1
d.	Small conflict in attempting to fix responsibility on each other when gear fails.	1
e.	CIC officer personally hard to get along with.	1
f.	CIC officer demands ETs time on trivial matters that his own men should be able to take care of.	1
g.	CIC officer fails to work through proper channels.	1

\* In terms of frequency of response.

\*\* For this item, there may be more than one answer for each respondent.  
Therefore, the N of the responses will not equal the N of the respondents.

Table 117

Abstracted Answers to Interview Question Asked of EMOS Concerning the Key to Effective Electronics Maintenance Aboard a Destroyer\*

N = 10\*\*

Item	Key Factors	Freq.
a.	Combining RD and ET efforts in preventive maintenance into a cooperative effort.	4
b.	Proper indoctrination of personnel in preventive maintenance procedure.	3
c.	More familiarity with gear (radio and radar men).	3
d.	Establishing incentive in personnel.	2
e.	Adequate supervision.	1
f.	Constant checking to see that preventive maint. is done.	1
g.	Good preventive maintenance procedure.	1
h.	Cooperation of CIC officer and EMO.	1
i.	Instilling responsibility in ETs.	1
j.	Better trained, more responsible personnel in electronics.	1
k.	Put ETs in operations department.	1
l.	Adequate test equipment.	1
m.	Leading petty officer of ETs should be at least an ET/l.	1

\* In terms of frequency of response.

\*\* For this item, there may be more than one answer for each respondent.  
Therefore, the N of the responses will not equal the N of the respondents.

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Table 118

Abstracted Answers to Interview Question Concerning Primary Duties of CIC Officers\*

Item	Primary Duties	Freq.
a.	CIC Officer.	8
b.	Operations Officer.	1
c.	Assistant CIC and ASW officer.	1
d.	Communications officer.	1
	Total N	11

\* In terms of frequency of response.

Table 119

Abstracted Answers to Interview Question Concerning Secondary Duties of CIC Officers\*  
N = 11\*\*

Item	Secondary Duties	Freq.
a.	Welfare and recreation officer.	4
b.	Assistant operations officer.	3
c.	Auditing board.	3
d.	Air controller.	3
e.	Ship's secretary.	2
f.	Intelligence officer.	2
g.	Survey board.	2
h.	Court-martial board.	2
i.	CIC officer.	1
j.	Narcotics inventory.	1
k.	Navigator.	1
l.	Coding board.	1
m.	Top secret control officer.	1
n.	Information and education officer.	1
o.	Public information officer.	1
p.	O division officer.	1
q.	Photographic officer.	1

\* In terms of frequency of response.

\*\* For this item, there may be more than one answer for each respondent. Therefore, the N of the responses will not equal the N of the respondents.

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Table 120

Abstracted Answers to Interview Question Asked of CIC Officers Concerning the Current Status of Preventive Maintenance Aboard Their Ships\*

Item	Preventive Maintenance Status	Freq.
a.	Radarmen do small proportion of PM and ETs do most.	5
b.	Regularly scheduled daily, weekly, and monthly checks.	2
c.	RDs assigned to specific gear.	1
d.	Radarmen do routine PM from cleaning gear to changing tubes. PM is well done.	1
e.	Radarmen do routine PM from cleaning gear to changing tubes. PM is poorly done.	1
f.	ETs do all PM.	1
	Dissension between EO and CIC officer. Each wants his own men to do it all. No decision.	1
Total N		11

\* In terms of frequency of response.

Table 121

Abstracted Answers to Interview Question Asked of CIC Officers as to What Preventive Maintenance Training RDS Get Aboard Ship\*

Item	Type of Training	Freq.
a.	No formal instructions for RDS. Lead petty officer shows men individually what to do.	4
b.	Lead RD has semi-organized discussion for RDS not on watch. No formal instructions.	1
c.	RDS get no training except when assisting ETs.	1
d.	ETs individually train RDS on equipment.	1
e.	Regularly scheduled training from ETs and lead RD petty officer. Have required reading, etc.	1
f.	Men are expected to train themselves.	1
Total N		9

\* In terms of frequency of response.

Table 122

Abstracted Answers to Interview Question Asked of CIC Officers as to the Relationship Between the CIC Officer and the EMO\*

Item	Relationship	Freq.
a.	No conflict.	7
b.	Slight friction in coordinating time and effort. Otherwise no conflict.	1
c.	EMO wants ETs to do PM. CIC officer wants RDS to do PM.	1
Total N		9

\* In terms of frequency of response.

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CRITICAL INCIDENT DATA

The summarized data derived from the critical incident technique consist of behavioral statements extracted from the incidents that were related by the ETs. The criteria for developing the statements are presented in the critical incident section of this report. The statements are listed below under the questions which elicited them. They are numbered for the purpose of ready reference, but they are in random order. Each statement is presented as many times as it occurred. If two or more incidents involved the same key behaviors, then two or more repetitions of the same statement will appear in the list below.

Critical incident question number 1 asked the ET to relate an incident where somebody did something that "fouled up" some electronic equipment. The key behaviors abstracted from the responses are as follows:

1. Cranked range crank past stop.
2. Failed to clean antenna insulators when performing preventive maintenance checks.
3. After instructed not to, deliberately placed jumper between receiver antenna and transmitter antenna.
4. Turned tuning knob past stops.
5. Made wrong adjustments in tuning transmitter.
  
6. Replaced lead on wrong terminal.
7. Threw refuse into transmitter.
8. Neglected to adjust gain control when putting equipment in operation.
9. Turned range indicator beyond stops.
10. Used motor generator unit when not authorized.
  
11. Jerked cable loose on handset.
12. Failed to make operator adjustments on repeater.
13. Keyed transmitter too long.
14. Left shorting bar across high voltage while trouble shooting in set.
15. Authorized removal of needed sound power circuit.
  
16. Adjusted relays contrary to orders.
17. Put transmitter crystal in receiver and receiver crystal in transmitter.
18. Put RF tube in backwards.
19. Forgot to hook up leads when replacing magnetron.
20. Left solder drippings in gear.
21. Put wrong tube in socket.

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22. Bumped interlock when walking by set.
23. Replaced wires without regard to proper connections.
24. Cranked manual control on antenna roughly.
25. Cranked range crank into stop.
  
26. Failed to adequately secure coffee pot.
27. Loaded PA stage too high in tuning gear.
28. Mistakenly connected chassis to AC power line.
29. Twisted band switch past stop.
30. Rested knee against receiver.
  
31. Broke off three cables when pulling out drawer of equipment.
32. Turned on the regulating transformers instead of the line voltage.
33. Failed to put gear in standby before applying power.
34. Connected transmitter-receiver to wrong terminals.
35. Attempted to repair gear when not authorized.
  
36. Wilfully made adjustments on transmitter contrary to instruction book.
37. Placed side panel of transmitter against electrically charged circuit.
38. Slewed sonar too long.
39. Soldered a short across a fuse terminal.
40. Failed to take proper precaution when opening magnetron cardboard container.
  
41. Forced a reduction gear, which had a bent key, onto armature arbor with a hammer.
42. Left large globs of solder when soldering connections.
43. Put tube in wrong position in socket.
44. Left transmitter door open contrary to posted instructions.
45. Allowed operation of equipment before repair gear was removed.
  
46. Failed to switch ohmmeter to voltage scale before making voltage measurements.
47. Failed to clean insulators in routine cleaning.
48. Rested foot on high voltage variac.
49. Dialed girl friend's phone number on transmitter remote unit.
50. Cranked range crank past zero stop.
  
51. Cranked range counter fast into stops.
52. Used bellows to clean dirt out of equipment.
53. Indiscriminately adjusted knobs in attempt to tune up transmitter.
54. Used transmitter switch to indicate dealer in card game.

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55. Twisted receiver band switch past stop.
56. Wiggled neon bulb to see it flash.
57. Pulled tube out of set too vigorously.
58. Attempted to repair set when unauthorized to do so.
59. Failed to replace light shield on radar.
60. Connected power cables to wrong terminals.
61. Stored powdered soap box on generator unit.
62. Attempted tuning adjustment without proper equipment.
63. Replaced unit so that small gear rubbed against frame.
64. Held sonar slew knob down too long.
65. Unscrewed cable at solder connections end rather than at socket end.
66. Removed side panels of transmitter to play cards on.
67. Prodding for loose connection with a screwdriver when set was operating.
68. Attached wire to wrong terminal.
69. Failed to push plug back in transmitter completely.
70. Failed to secure gear to keep it from falling to the deck.
71. Failed to replace critical bracket after repair of equipment.
72. Took voltage reading without switching to proper meter scale.
73. Failed to discover loose potentiometer on bulkhead during routine checks.
74. Put an overamperage fuse in a piece of gear.
75. Failed to shut down radiation before changing pulse width.
76. Replaced leads in reverse after cleaning.
77. Cranked range helipot into stops.
78. Neglected to identify leads when removing them for cleaning.
79. Propped feet upon equipment.
80. Keyed transmitter while there was a jumper between a transmitter antenna and a receiver antenna.
81. Twisted switch past stop.
82. Failed to resonate peak on IPA stage in tuning gear.
83. Broke crystal meter when moving steel boxes.
84. Attempted to tune director without authorization.
85. Turned selector switch to wrong position.
86. Failed to check search switch before attempting to operate equipment.
87. Failed to close watertight cover on phones on the bridge.
88. Detuned transmitter while operator was transmitting.
89. Neglected to turn off steam in scullery before going to

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- battle station.
90. Keyed transmitter too long.
91. Painted antenna insulators.
92. Used both automatic and manual antenna train at the same time, contrary to instructions.
93. Tried to run test leads into difficult place with set in operation.
94. Made wrong adjustments in tuning up transmitter.
95. Broke off metal rod from insulator when trying to remove it.
96. Connected a wire in the wrong place.
97. Opened a switch while cleaning equipment and failed to return it to its original position.
98. Forgot to turn on power switch.
99. Threw synchro switch in wrong position.
100. Switched frequencies while tuning knobs were unlocked.
101. Threw wrong switches on gear when trying to turn it on.
102. Connected leads to chassis backwards.
103. Twisted tuning knob past stops.
104. Failed to identify wires when removing them for cleaning.
105. Keyed detuned transmitter while playing around.
106. Failed to put antenna transmit switch in receive position before keying.
107. Flicked switch past stop.
108. Pulled all the tubes from set without authorization.
109. Jarred equipment with boxes when moving them around.
110. Jammed sliding capacitor.
111. Stepped on power cord, pulling it from socket.
112. Failed to throw gyro switch before operating gear.
113. Dropped hand set on deck.
114. Reassembled search switch, leaving out certain components.
115. Failed to press start button before calling an ET.
116. Unauthorized person pounded on the IF section of a receiver in attempting repair.
117. Put anti-rust compound on rotating shaft.
118. Propped shorting bar open with screwdriver when trouble shooting.
119. Made circuit change so antenna would operate manually and automatically at the same time.
120. Threw a switch which he was instructed not to touch.
121. Shoved drawer back into set too vigorously.
122. Made wrong connections on patch panel.

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123. Failed to lock tuning heads down on the TDZ.
124. Fired up set before taking voltage checks on power unit.
125. Turned switch in the wrong position.
  
126. Turned off wrong switch.
127. Replaced plugs in wrong sockets while cleaning gear.
128. Kicked switches on and off.
129. Failed to tag leads when disconnecting them.

Critical incident question number 2 asked the ET for incidents in which a piece of electronic equipment was shut down longer than should have been. The following list is the key behaviors that were abstracted from the responses.

1. Failed to check fuses early in trouble shooting.
2. Failed to make adequate visual check for burned components.
3. Failed to check switches when looking for trouble.
4. Failed to stick to the job in making a repair.
5. Put off replacing tube borrowed from set.
  
6. Checked component incorrectly because of lack of knowledge.
7. Missed a stage in trouble shooting.
8. Failed to await reply to radio check before calling an ET.
9. Failed or refused to give assistance to ETs by making radio check.
10. Failed to notify ETs of intermittent trouble in radar.
  
11. Failed to consider need for mechanical adjustments.
12. Failed to check tubes before more difficult analysis.
13. Failed to make adequate visual checks for broken components.
14. Failed to check switch.
15. Failed to complete repair due to lack of interest.
  
16. Did not understand instruction book.
17. Replaced all removable components without checking them.
18. Failed to use instruction book in setting up gear.
19. Continued replacing tubes as they blew out rather than locating source of the trouble.
20. Refused to take advice of ET in trouble shooting.
  
21. Failed to notify ET of gear failure.
22. Assumed spare multi-jack plug was of proper size while installing it when actually it was too large.
23. Failed to check line fuses in trouble shooting.
24. Failed to check fuse indicator.
25. Failed to check tube replacement to see if it was faulty.

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26. Put off cleaning of equipment.
27. Did not find trouble in spite of repeated attempts.
28. Dissassembled switch when trouble was elsewhere.
29. Failed to use instruction book adequately.
30. Replaced tubes as they burned out when the real trouble was a faulty socket.
  
31. Got in ETs way when he was trouble shooting gear.
32. Did not call ETs when jerky sweep on PPI was noticed.
33. Overlooked faulty switch in trouble shooting.
34. Failed to check fuses early in repair.
35. Failed to check switches in trouble shooting.
  
36. Refused to allow ETs to attempt repair of antenna.
37. Put off working on gear because of difficulty of job.
38. Failed to complete repair despite intensive effort.
39. Attempted repair by adjustment of relays when the real trouble was in the power stage.
40. Failed to consult proper blueprints.
  
41. Replaced burned out thyratrons before locating source of difficulty.
42. Interfered with men working on job.
43. Failed to notify ET of messing with gear.
44. Failed to consider possibility of faulty test equipment.
45. Failed to check fuses early in trouble shooting.
  
46. Forgot to check switch.
47. Locked ETs out to keep them from repairing equipment.
48. Avoided a repair because of its complexity.
49. Failed to locate trouble on new piece of gear.
50. Did not record circuit change in instruction book.
  
51. Failed to read instruction book carefully.
52. Replaced burned out magnetrons before locating source of difficulty.
53. Allowed spare parts boxes to be stowed around equipment.
54. Did not report twisting band switch past stops.
55. Assigned ETs to unfamiliar job unsupervised.
  
56. Failed to check fuse and tubes in trouble shooting.
57. Neglected to check switch in trouble shooting.
58. Interfered with ETs trouble shooting.
59. Failed to stick to job in repairing a gear.
60. Slow in repair because of inadequate knowledge of gear.
  
61. Failed to order spare parts.

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- 62. Failed to check schematic diagram adequately.
- 63. Refused to turn repair over to properly trained personnel.
- 64. Stored boxes in front of equipment.
- 65. Failed to report twisting switch past stops.
  
- 66. Overlooked the possibility of bad wiring in high voltage circuit.
- 67. Failed to make adequate visual check for broken components.
- 68. Attempted turning on gear in corrective maintenance before checking switches first.
- 69. Assumed other ship was at fault for poor communication.
- 70. Refused to fix holes in deck.
  
- 71. Gave up repair after two days work.
- 72. Failed to change schematic according to field change.
- 73. Failed to check intensity adjustment before calling ET.
- 74. Failed to check the work of inexperienced subordinate.
- 75. Failed to notify ETs of gear failure.
  
- 76. Failed to consider possibility that tube tester would not adequately test tube.
- 77. Failed to locate intermittent short in TR tube.

Critical incident question number 3 asked for an incident in which an ET did something that led to a more than normally successful situation. The key behaviors that were abstracted from the responses to this question are as follows:

- 1. Made difficult motor generator repair, by patient work.
- 2. Located trouble despite faulty instruction book.
- 3. Repaired bad tuning mechanism in emergency by cutting out the section giving trouble.
- 4. Manufactured barrel clips for damaged radar.
- 5. Used schematic skillfully in order to locate bad capacitor.
  
- 6. Devised squelch circuit to replace faulty one.
- 7. By-passed burned out section of high voltage power supply when no spares were available.
- 8. Rigged up temporary blower motor to replace burned out one.
- 9. Completed tedious job without quitting.
- 10. Used ingenuity in repairing antenna without proper equipment.
  
- 11. Did outstanding job in rewiring circuit.
- 12. Made up chemical compound to eliminate corrosion in wave guide.
- 13. Used light bulb to isolate trouble spot that would not show up on a meter.

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14. Increased length of antenna so could get out on higher frequencies.
15. By-passed coils when no replacement was available.
16. Replaced shorted out wires in a circuit by using graphite pencil.
17. Worked steadily for long hours in order to repair radar.
18. Remained undisturbed in trouble shooting despite outside pressure.
19. Rewired high voltage unit.
20. Manufactured clamp to hold antenna together.
21. Developed device to measure high voltage when no meter was available.
22. Worked rapidly in order to get fire control gear repaired.
23. Substituted TDZ generator for unfixable AN/ARC generator.
24. Repaired unusually bad transmitter by precise, accurate work.
25. Rewound transformer when no replacement was available.
26. Made unusual repair on damaged switch.
27. Repaired three fire control radars in a short time, by coordinating work.
28. Combined numerous trouble shooting procedures in order to locate burned out resistor.
29. Designed a bias supply to eliminate faulty thyratron operation.
30. Shorted out faulty switch to make set operate quickly.
31. Designed new wiring setup to by-pass burned out slip rings.
32. Put in a jury rig for a bad rectifier unit that had no replacement.
33. Located intermittent shorted capacitor, which others failed to locate, by patient and thorough work.
34. Rewired needed power supply.
35. Repaired badly damaged telescopic capacitor when no spares were available.
36. Repaired set in minimum time by cooperation.
37. Worked steadily and carefully in order to locate source of trouble.
38. Devised a rectifier circuit to replace a faulty motor generator.
39. Rigged up a fuse holder to replace a bad one that had no replacement.
40. Combined six transformers to replace a burned out one they did not have a replacement for.
41. Attempted numerous procedures in order to remove faulty blower motor from inaccessible spot.
42. Repaired antenna under fire.
43. Rewound motor field.

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44. Performed difficult job of repairing a broken helipot, which required high mechanical skill.
45. Repaired gear in minimum time by working in shifts for many hours.
46. Used exceptional speed in repairing a fire control gear.
47. Figured out a circuit change to repair gear an engineer could not fix.
48. Combined five transformers to replace one burned out one when no spare was available.
49. Substituted amplifier power supply for burned out dynamotor.
50. Located soap on motor-generator commutators, by careful and thorough trouble shooting.
51. Made difficult antenna repair under extremely cold and difficult conditions.
52. Rewound burned out transformer.
53. Made brushes for motor generator when none were available.
54. Shorted out interlocks with power on and doors open.
55. Used extreme speed in repairing gear.
56. Calculated change in voltage divider network to correct the trouble.
57. Substituted tube with different characteristics to eliminate recurring trouble.
58. Substituted repeater for damaged console of radar.

Critical incident question number 4 asked the ET to relate an incident in his experience in which he had to solve a maintenance problem he had never before encountered. The purpose of this question was to determine the procedures ETs use to solve new problems. The behavioral statements abstracted from the responses to this question which express the procedures the ETs used are as follows:

1. Applied general knowledge of series and parallel circuits to find that electrical circuit was hooked up wrong.
2. Recalled basic school training to locate and correct difficulty.
3. Traced out the circuit from the schematic.
4. Systematically analyzed circuit to find poor solder connection.
5. Used a process of elimination to determine the noise source.
6. Generalized from knowledge of old model radar to repair new one.
7. Traced through schematic and followed the instruction book.
8. Made systematic voltage checks following the instruction book.

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9. Found bad capacitor by using basic knowledge of radars.
10. Improvised a capacitor to eliminate the DC component of voltages.
11. Used schematic to locate trouble and adjust set.
12. Traced wires systematically to determine patch panel circuits.
13. Analyzed circuit by process of elimination.
14. Generalized from knowledge of transformers gained by experience with other gear.
15. Followed instruction book to locate the trouble.
16. Developed understanding of the equipment by relating the block diagram to knowledge of general radar circuits.
17. Recalled basic knowledge of electronic circuitry to locate bad resistor.
18. Referred to Electron to rewire phone.
19. Traced down bad crystal by following the instruction book.
20. Systematically traced back through circuit from symptom to locate the trouble.
21. Played hunch after looking around.
22. Used echo box on an unfamiliar equipment by generalizing from procedures used on a familiar one.
23. Followed the procedure in the instruction book to locate the trouble.
24. Experimented with unit until the trouble was found, using basic knowledge.
25. Repaired gear by visual inspection and using basic knowledge of transmitters.
26. Systematically followed blueprints to determine the right patch panel connections.
27. Diagnosed trouble by using the schematic.
28. Used burned out coil as a model to make a new one.
29. Repaired set by consulting with, and taking the advice of, an engineer.
30. Repaired set by replacing tubes systematically.
31. Generalized from known transmitter to similar new transmitter.
32. Repaired set by closely following the instruction book.
33. Used basic knowledge of radar to repair set.
34. Repaired old spare amplifier to replace burned out one.
35. Slowly located bad tube in sweep circuit by being systematic and using the schematic.
36. Analyzed cause of mechanical trouble by following the schematic.
37. Consulted a civilian yard worker on the problem and followed

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- his suggestions.
38. Recalled problem from past experiences with similar gear.
  39. Used experience and knowledge from familiar gear to trouble shoot new gear.
  40. Repaired set by following steps in the instruction book.
  41. Corrected difficulty by using instruction book, and obtaining ET assistance.

Critical incident question number 5 asked for incidents in which the design of a piece of electronic equipment restricted the speed and skill of the man working on it. The statements abstracted from the responses to this question contain behavioral restrictions imposed by the design of various equipment. The following is a list of the statements obtained.

1. Must remove several units before can remove high voltage lead to a scope in SG.
2. Necessary to remove several units from SG in order to get at a synchro in range-train indicator.
3. Removal of slip rings of focus coil of SG master unit necessitate prior removal of many components.
4. Relays behind resistors in lower section of TBL inaccessible.
5. Compactness of AN/ARC makes it difficult to test most components and impossible to test some without unsoldering connections and taking them out.
6. MK-25 so compact it requires excessive removal of components in order to locate intermittent shorts.
7. Capacitor in 1st IF amplifier stage is inaccessible.
8. TDZ cable extension (used to supply power while servicing gear) is difficult to plug in and it jiggles loose.
9. AN/ARC difficult to troubleshoot with power on.
10. TDZ power amplifier fastened with "too many" screws.
11. Ridges on knobs of TDZ make fingers sore when required to set up all channels.
12. TDZ drawers too heavy and bulky to be turned by one man.
13. Have to remove several components of TBL to get at one.
14. Had to remove TBL frame brace to remove antenna inductance coil.
15. To remove scanner on SP antenna it is necessary to take much of the antenna apart.
16. Removal of SG high voltage transformer necessitated prior removal of much of transmitter.

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17. Tuning capacitor on TDQ extremely hard to reach.
18. TDZ so compact that it is difficult to service.
19. AN/ARC so compact can't get hands or tools into it to disconnect leads from components.
20. Compactness and poor organization of parts make it difficult to work on components in MK-34.
  
21. TDZ connecting cables difficult to use.
22. Have to set TCS on chair and hold interlock down with hand in order to work on it.
23. RBS has to have 25-30 screws removed in order to take it out of case.
24. TDZ dial system too small.
25. Difficult to replace front panel because connectors are geared on piece of sponge.
  
26. Fuse locations on SC radar difficult to reach.
27. Have to remove a number of parts from TBL to reach capacitors.
28. To get at oscillator circuit in MK-25, have to remove part of wave guide and the mixer chassis.
29. SC potentiometer centering control difficult to remove because nuts and bolts holding it are almost inaccessible, and it also requires that other parts be removed before you can get at it.
30. TBL coil difficult to replace because of position in gear.
  
31. AN/ARC too compact.
32. AN/ARC so compact it is difficult to make operating voltage checks.
33. Need for a test harness on TDZ makes trouble shooting difficult.
34. Receiver input and output jacks are located at rear of drawer making it difficult to make connections.
35. External cables in the MK34 makes opening the drawer difficult and causes excessive strain on the cables.
  
36. Removal of the SC console drawer requires tagging of many leads.
37. Tubes in the tripler stages of TDZ require force in order to remove them from their sockets.
38. Must remove about thirty screws in order to remove side panels of VF.
39. Location of terminal boards on the VF and the size of the panels makes it difficult to get at and see the terminal boards.
40. Must remove the PPI tube in the VF to get at some of the terminal boards.
  
41. Difficult to replace connections on binding post of RF unit in the TDQ because of compactness of the unit and inability to gain

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- access through back or side due to lack of panels.
- 42. Inaccessible capacitor (C22) in SP transmitter requires the removal of a number of other parts to get to it.
  - 43. Radar indicator is mounted too close to top of SU transmitter making it necessary to remove other units to get at the modulator output transformer.
  - 44. TBL capacitor (C45) is difficult to replace because it requires the removal of other parts to remove it.
  - 45. Necessary to disassemble the compact AN/ARC to make simple replacements.
46. Crowded condition of the TCS circuits slows down maintenance.
47. VF is so arranged it is impossible to clean the dirt out in many places.
48. TDZ patch extension is difficult to plug in.
49. Terminal board for resistors in the SC faces the back of the equipment making it necessary to remove drawer and shut down equipment in order to get at it.
50. External cabling on the MK34 makes it difficult to realize a bad cable.
51. Relays in the amplifier of the SP are not labeled clearly, making it difficult to identify them.
52. Compactness and poor organization of parts in the MK34 makes soldering of parts difficult and unsafe.
53. Locks on tubes and inadequate space makes it difficult to replace tubes in the MK34.
54. Special tools are required to dismount the master start relay in the TDZ.
55. Collar on the master oscillator tuning control cannot be loosened without removal of other parts.
56. Must remove front part of set to get at a potentiometer in the SC.
57. Hard to replace potentiometer in the SC because of the awkward position in replacing screws.
58. Replacement of selector switch on the VJ necessitates prior removal of many parts.
59. Difficult to remove magnetron in the SL because it is hard to get back to where it is located.
60. SG is overcrowded because of many field changes.
61. Compactness of the RDZ makes it difficult and unsafe to remove and replace some of the vacuum tubes.
62. AN/SPS6 is difficult to work on because the parts are not systematically arranged.
63. The need for the extension cable makes it inconvenient to

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- work on the TDZ with the power on.
64. Lack of a battle short switch on the VF makes it difficult to trace trouble while the set is running.
65. SR cables to the coax cables catch and break easily when drawers are pulled out.
66. AN/ARC is so compact it is hard to find many of the components.
67. The single terminal strip in the AN/ARC makes it necessary to draw a schematic before removing wires.
68. Necessary to remove guard channel from AN/ARC in order to get at a resistor to check it.
69. In QJB it is necessary to remove drawer from the set in order to trouble shoot tubes and make some adjustments.
70. The large number of separate and interrelated units in the QJB makes it difficult to isolate trouble since it may not be in the units when the symptoms appear.
71. The AN/ARC is too compact to work on, especially without the proper facilities.
72. It is virtually impossible to replace the small insulator in the TDE tuning control without special tools because of its location among other parts.

Critical incident question number 6 asked for the ET to tell about the last time he worked on sonar equipment. From the responses to this question, statements were abstracted which expressed the work ETs did in sonar maintenance. The following is a list of the statements obtained.

1. Located and replaced pawl in train mechanism.
2. Diagnosed cause of no audio for sweeps - found interlocks open.
3. Diagnosed trouble and replaced bearing in data converter.
4. Diagnosed reason for poor echoes. Replaced high voltage tube.
5. Located and replaced burned out transformer.
  
6. Located and replaced keying relay.
7. Took test equipment to sonarmen.
8. Adjusted and aligned set.
9. Located and replaced line fuse.
10. Located and replaced rotar head in JV switch.
  
11. Located and replaced transmitter tube.
12. Located and repaired shorted terminal board.
13. Located and cleaned contacts on lowering relay.
14. Located and replaced transmitter tube.
15. Corrected poor switch contact after diagnosing trouble.

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16. Located and replaced several bad tubes.
  17. Made adjustments according to Electron field change.
  18. Realigned the VFO and audio channel.
  19. Located and corrected binding caused by crooked drawer.
  20. Located and corrected switch causing fuses to blow.
  21. Located and attempted to repair burned out transformer and stuck shaft.
  22. Advised the sonarmen to check the filament transformer.
  23. Located and replaced two tubes and a fuse.
  24. Located dirty contacts in transducer.
  25. Gave suggestions on how to locate intermittent short,
  26. Located trouble in switch.
  27. Repaired cable to bearing deviation indicator after diagnosing trouble.
  28. Got transformer out of spare parts for sonarmen.
  29. Diagnosed trouble and replaced the rotary contacts on the hoists.
  30. Located and replaced tube in the beat frequency oscillator circuit.
  31. Narrowed down trouble to switch in the transmission line.  
1) Thirty-five ETs stated that they have done no maintenance work in sonar.
- Critical incident question number 7 asked for the ET to tell about the last time he worked on fire control equipment. From the responses to this question, statements were abstracted which expressed the work ETs did in fire control maintenance.<sup>2</sup> The following is a list of the statements obtained.
1. Located bad crystals.
  2. Replaced bad tubes after locating them.
  3. Tuned the transmitter.
  4. Located and replaced a bad crystal.
  5. Found and replaced a bad tube.
  6. Located a bad crystal.
  7. Adjusted elevation and train unit.
  8. Located and replaced a bad tube.
  9. Located and repaired a bad cable.
  10. Located and replaced a bad tube.
  11. Balanced out the range and tracking.

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12. Tuned the transmitter.
13. Tried to diagnose the trouble with the AFC.
14. Located and repaired a bad connector to the slewing switch.
15. Aligned the IF strip and made other adjustments.
  
16. Diagnosed and replaced a bad resistor in the thyratron.
17. Located and replaced a bad tube.
18. Recalibrated the range.
19. Trouble shot and replaced the TR tube.
20. Trouble shot and replaced the circle generator tube.
  
21. Assisted an FC in making a tube replacement.
22. Replaced thyratron after locating the trouble.
23. Adjusted the AGC circuit.
24. Located and replaced bad crystals.
25. Located and replaced some bad tubes.
  
26. Made some circuit adjustments.
27. Located the trouble and replaced a thyratron.
28. Located and replaced a bad transformer.
29. Located and replaced a bad tube.
30. Made mechanical adjustments.
  
31. Located and replaced a burned out transformer.
32. Located and replaced a shorted condenser.
33. Adjusted gear.
34. Located and replaced a tube.
35. Located and replaced a tube.
  
36. Diagnosed and replaced a tube.
37. Diagnosed the trouble and replaced a capacitor.
38. Located and replaced tube.
39. Attempted to diagnose trouble in attack unit.
40. Assisted FCs in locating and replacing bad tubes.
  
41. Advised FCs as to possible source of trouble.

2) Twenty-three ETs stated that they have done no maintenance work in fire control.

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Table 123

Troubles Encountered on Various Types of Equipment and the Parts Used to Correct These Troubles as Reported on the Record Summary Form\*

Type of Gear	Nature of Trouble	Parts Used
1. SG-1b radar	Low emission.	V110
2. SG-1b radar	Old age.	V111
3. SG-1b radar	Old age.	V112
4. SG-1b radar	Multiple pulsing, poor ring time, distorted trigger pulse.	V401, V407, V106, V107.
5. SG-1b radar	No range marks on scope.	6SN7
6. SG-1b radar	Erratic operation of tube focusing.	7BP7A
7. SG-1b radar	Unstable markers.	C447.
8. SG-1b radar	Radar inoperative.	V106.
9. SG-1b radar	Erratic noises seen on scope presentation.	Klystron, magnetron, 6V6, 6SN7, 6SC7.
10. SG-1b radar	Unstable operation.	V110 magnetron.
11. SG-1b radar	Blower motor stopped.	Brushes.
12. SG-1b radar	No transmitter current.	4 tubes.
13. SG-1b radar	Double moding.	Magnetron.
14. SG-1b radar	Unstable range markers.	8 tubes.
15. SG-1b radar	Unstable tuning, low ring time.	4 tubes.
16. SG-1b radar	Faulty trigger, causing jumpy sweep & multiple output.	1 tube.
17. SG-1b radar	Short sweep on PPI.	C469.
18. SG-1b radar	No xmtr current or sweep on A or PPI scopes.	721B, 1N21B.

\* Although the Record Summary Form endeavored to obtain information about other aspects of repairs, such as symptoms, the rate of the man performing the repair, etc., it was found that the information presented here was all that was consistently available on the records kept by the EEs aboard the ships.

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Table 123 (continued)

Type of Gear	Nature of Trouble	Parts Used
19. SG-1b radar	Synchro overheating.	B905
20. SU-1a radar	Very erratic sweep on A and B scopes.	B513, C608.
21. SU-1a radar	Defective time delay relay.	Time delay relay.
22. SU-1a radar	Broken switch.	Power on-off switch.
23. SU-1a radar	Broken shaft on focus control R-674.	No spare - replacement made.
24. SU-1a radar	Leaky condenser.	C656.
25. SU-1a radar	Gaseous tube.	2X2A.
26. SU-1a radar	Defective tube.	V516.
27. SU-1a radar	Bad tube.	Tube.
28. SU-1a radar	No gain in A scope.	6A67.
29. SU-1a radar	Tube failure.	3C23.
30. SA-2 radar	No output from transmitter.	2 S014A's, V101, V102.
31. SA-2 radar	No xmtr pulse on indicator, plate current meter pinned.	V102.
32. SA-2 radar	Lag in sweep in PPI.	V411, V1221, V1202, R12104, R1283.
33. SA-2 radar	No sweep on A scope.	V409.
34. SA-2 radar	PPI scope dead.	V1209.
35. AN/SPS radar	Magnetron gassy.	Magnetron.
36. AN/SPS radar	No maggie current. No sweep on A scope or PPI.	C119.
37. AN/SPS radar	Antenna would not follow drive motor.	Bolt H1311.
38. AN/SPS radar	Low sensitivity.	TRX crystal 1B23 and IN25.
39. SG-6 radar	Low magnetron current.	Magnetron.
40. SG-6 radar	No magnetron current.	Modulator tube.
41. SG-6 radar	Couldn't get target on VJ.	Tube.

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Table 123 (continued)

Type of Gear	Nature of Trouble	Parts Used
42. SU radar	Weak echoes, no grass.	V3106.
43. SU radar	Double range markers.	V531.
44. SG radar	Sweep on A scope starts at center of scope.	V109 635.
45. SG radar	Pulse-frequency switch on console broken.	S911.
46. AN/SGC-1a radar	Key relay not working.	V102.
47. AN/SGC radar	Unable to get correct meter reading, loop current low.	Relay contact (K103).
48. Servo-amplifier	Would not follow selsyns from CIC.	2 6L6's, 6SN7.
49. SR-6 radar	No crystal current.	Resistor.
50. SP radar	Shorted wire to dial light.	Wire.
51. SL-1 radar	No sweep VD-2 repeater.	V1012.
52. SC-5 radar	Pulse length too long.	R315.
53. SC-3 radar	No transmitter output to antenna.	Points in duplexer.
54. SC radar	Focus on PPI intermittent.	Potentiometer.
55. VJ repeater	No indicator lights.	Transformer.
56. VJ repeater	No sweep on video.	Capacitor.
57. VJ repeater	Poor video picture.	CRT.
58. VJ repeater	80 & 16 mile range too short.	C522.
59. VJ repeater	Range ring jittery.	6B4.
60. VJ repeater	Wiring in indicator smoking.	S601, PPI tube, wiring.
61. VJ repeater	No spot on B scope.	6SN7, C421.
62. VJ repeater	Range incorrect.	R1006.
63. VJ repeater	PPI sweep would not follow master radar.	None.

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Table 123 (continued)

Type of Gear	Nature of Trouble	Parts Used
64. VJ repeater	Kept blowing F-101.	0192.
65. VJ repeater	Vertical sweep bunched at end of sweep.	V205 6V6.
66. VF repeater	PPI sweep not following master radar.	E202.
67. VF repeater	No sweep on PPI.	Rectifier tube..
68. VF repeater	B scope spot would not return.	Washer.
69. VJ repeater	B scope would not track.	Osc. coil, osc., heater coil.
70. VF repeater	No B presentation.	V201.
71. VD repeater	No sweep.	6SN7.
72. TDZ radio	Very weak output.	2 C39's.
73. TDZ radio	Burned out tube.	V118.
74. TDZ radio	No output in 3rd tripper & PA, no remote station.	V111, V115, V116, V117, V118.
75. TDZ radio	Burned out tube.	2C39.
76. TDZ radio	Low output.	2C39 (V117).
77. TDZ radio	No output.	2C39.
78. TBS radio	Burned out tube.	6D6.
79. TBS radio	Interlock not catching.	None.
80. TBS radio	Out of line.	None.
81. TBS radio	Broken plug.	Plug.
82. TED radio	Relay sticking in transmit position.	None.
83. TED radio	Open filament in oscillator & volume-expand clamer.	V109.
84. TED radio	Open filament in modulator.	V201.
85. TED radio	Gassy tube.	V303.

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Table 123 (continued)

Type of Gear	Nature of Trouble	Parts Used
86. AN/ARC-1 radio	Gassy tube.	V104.
87. AN/ARC-1 radio	Broken resistor.	R115.
88. AN/ARC-1 radio	Drive motor shorting out.	None.
89. TBL radio	Unable to zero-beat.	V1, V2.
90. TBL radio	Overload open, no plate voltage.	K322.
91. TBL radio	No reading on doubler meter.	860.
92. TBS-5 radio	Garbled and weak receiver, detector pinned meter.	V401, R402.
93. TCS radio	Open antenna current meter.	Ammeter.
94. TCS radio	Won't key, no power.	3 amp. fuse, 6X5.
95. TDQ radio	Weak output.	4 tubes.
96. TDQ radio	Transmitter wouldn't key, no osc. current when it did key.	Fuse, tube.
97. TDY radio	Leak.	None.
98. TDY radio	Arcing selenium rectifier.	CR101.
99. AN/ARC radio	Generally poor performance.	6V6, 12SL7, 832, 6J6, 8 6AK5's, 6C5, 12SA6.
100. AN/ARC radio	Low transmitter output.	8 6AK5's, 2 832A's.
101. Teletype	Carriage would not return.	Carriage return strap.
102. Teletype	Motor stopped.	None.
103. NMC	No keying.	Relay contact E417.
104. MBF	Squelch circuit inoperative.	6AQ6, 3 6C5's
105. TDE radio	Interlock making poor contact.	S501.
106. TBL-13 radio	No output to intermediate amplifier.	V1.
107. TBL-7 radio	Open filament.	V3.
108. RDZ radio	Noise limiter does not work.	V110.

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Table 123 (continued)

Type of Gear	Nature of Trouble	Parts Used
109. RDZ radio	No receiver noise.	4 tubes.
110. RDZ radio	Weak.	V105, V106.
111. RDZ radio	Loss of B-plus.	Rectifier tube.
112. RDZ radio	Output garbled.	V204.
113. RDZ radio	Noise in output.	Tubes
114. RDZ radio	Low gain.	RF mixer tube.
115. RAO-3 radio	Tube socket failure in HF osc.	Tube socket.
116. RAO-3 radio	Low output.	2 6J5's.
117. RAO-3 radio	Bad tube.	6K7.
118. RCK radio	No output, plate voltage low.	6J5, 956, 6AB7, 5U4.
119. RCK radio	Low sensitivity on all crystal positions.	Tubes.
120. RBO radio	No reception.	3525.
121. RBO radio	No B-plus.	C103.
122. RBS radio	No reception on Band 1.	None.
123. RBE-2 radio	Audio volume control would cut out.	R-107.
124. RBC radio	No reception, no HV to plate of local oscillator.	C203, R206.
125. RBB radio	Not operating.	6AB7.
126. RAS radio	Inoperative.	V902, V903, V901, T901.
127. RAL-7 radio	No reception.	V106, V102.
128. RAL-7 radio	No reception.	6 tubes, transformer.
129. RAL radio	Not operating.	V201, V202, V203.
130. MK25 med. 2 radar	B sweep varied intensity.	R(13a)1, R(13a)22.
131. MK25 med. 2 radar	scope intensity very high.	xtal 400C, CR(4A)2, CR(4A)1.

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Table 123 (continued)

Type of Gear	Nature of Trouble	Parts Used
132. MK25 mod. Gear inoperative. 2 radar		2 resistors, 2 tubes.
133. MK25 mod. AFC not locking in properly. 2 radar		6J6, 6AK5.
134. MK25 mod. Double range mark. 2 radar		6AK5, 6AC7.
135. MK25 mod. Range dial indicators out. 2 radar		4 type 44 indicator lights.
136. MK25 mod. Trainer's ready light out. 2 radar		light bulb.
137. MK25 mod. AFC not locking in, no Xtal 2 radar current in auto track.		2K45(10), 2 Xtals.
138. MK25 mod. Plus 300V. supply low, auto 2 radar tracker not tracking.		Bal. rectifier.
139. MK25 mod. Not enough range marks on B and E 2 radar scopes.		Tubes.
140. MK25 mod. Unit wouldn't lock in. 2 radar		2K45 (klystron.)
141. MK25 mod. AFC would not work. 2 radar		2C45, 6AS6, 6AK5, 6J6.
142. MK25 mod. Low crystal current. 2 radar		Impedance net.
143. MK-34 radar	Precision sweep blanking & overall intensity bad.	5EP1.
144. MK-34 radar	No range marks.	V314 (6SN7).
145. MK-34 radar	No range marks.	V314 (6SN7).
146. MK-34 radar	No range marks.	22 ohm 2 watt resistor.
147. MK-34 radar	Too many range notches - would not range.	C348.
148. MK-26 radar	Sweep moved off to left then fluctuated back and forth.	V115.
149. MK-25 mod. 1 radar	Short sweep on A scope.	2 IN45's.
150. DAS-3 loran	2X2 shorting, blew power fuse, fast sweep int. too high.	V127, V135.
151. DAS-3 loran	Antenna grounding.	None.
152. DAS-4 loran	No counter feed-back in test position.	C118.
153. BM IFF	Poor gain.	C132.
154. IFF CO	No IFF sweep.	Switching tube.

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Table 123 (continued)

Type of Gear	Nature of Trouble	Parts Used
155. QJB sonar	Gassy tube.	V804.
156. QJB sonar	Gassy tube.	V805.
157. QJB sonar	Gassy tube.	V806.
158. QJB sonar	High voltage breakdown.	C802.
159. QJB sonar	Overloaded tube.	V805.
160. QJB sonar	Gassy tube.	V801.
161. AN/SQS-10 sonar	Sweep not starting in center of scope.	X-103.
162. AN/SQS-10 sonar	Stern line on stock continued circling scope, wouldn't stop.	V1207, V1219.
163. AN/SQS-10 sonar	No indication of nature of trouble.	Isolation trans- former on 29 m.c.
164. AN/SQS-10 sonar	Spot in middle of screen.	V1301.
165. AN/SQS-10 sonar	Low video output.	12AU7.
166. Speaker Amplifier	Speaker loose.	None.
167. Speaker Amplifier	Not working.	2 35L6's.
168. Speaker Amplifier	Volume very low.	V101, U202, U203.
169. Motor- generator	Bad bearings and brushes.	Bearing, brushes.
170. Motor- generator	Bad bearings and brushes.	Bearing, brushes.

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Table 124

## Training Questionnaire

Median Ratings and Qs for the Non-Performance Items of Training Questionnaire  
Arranged in Order of Median Values

Order	Item	Mdn*	Q
1.	Uses of voltmeter, ammeter, and ohmmeters.	1.09	.30
2.	Principles of receivers.	1.14	.32
3.	Essential features of D.C. and A.C. circuits.	1.22	.42
4.	Principles of current flow.	1.23	.49
5.	Uses of vacuum tubes.	1.24	.45
6.	Concept of resistance.	1.26	.50
7.	Discussion of color coding systems.	1.32	.60
8.	Test circuit continuity.	1.35	.50
9.	Theory of Class A amplifiers.	1.41	.64
10.	Sources of trouble in power supply.	1.42	.56
11.5	Characteristics of series-resonant circuits.	1.43	.66
11.5	Theory of electron emission.	1.43	.71
13.5	Principles of capacitance.	1.47	.56
13.5	The theory of Class C amplifiers.	1.47	.64
15.	Theory of operation of various radar sets.	1.52	.64
16.	Theory of operation of cathode ray tubes.	1.55	.55
17.	The uses of IF amplifiers.	1.56	.59
18.	Theory of rectifiers.	1.59	.56
19.5	Theory of impedance.	1.60	.67
19.5	Theory of operation of R-C coupled amplifiers.	1.60	.61
21.	The theory of crystal oscillators.	1.61	.67
22.	The theory of Class B amplifiers.	1.62	.86
23.	Types and uses of detectors.	1.63	.60
24.5	Types and uses of radar scopes.	1.65	.64
24.5	Principles of inductance.	1.65	.57
26.	Concept of carrier waves.	1.66	.68
27.	Kirchoff's laws.	1.67	.97
28.	Theory of the multi-vibrator.	1.69	.65
29.	Types of power supply circuits.	1.74	.57
30.	The uses of video amplifiers.	1.75	.64
31.	The uses of R-F amplifiers.	1.77	.57
32.	Theory of impedance matching.	1.78	.59
33.	Uses of transformers.	1.79	.38
34.5	Characteristics of series LC circuits.	1.81	.76
34.5	Theory of operation of push-pull amplifiers.	1.81	.60

\* A median of 1.00 is highest possible value indicating maximum value for job proficiency.

Order	Item	Mdn*	Q
36.	The uses of audio-amplifiers.	1.82	.57
37.	The theory of beat frequency audio oscillators.	1.84	.67
39.	Applications of rectifiers.	1.85	.65
39.	Theory of the cathode follower.	1.85	.59
39.	The concept of band width.	1.85	.71
42.	Theory of operation of transformers.	1.86	.83
42.	Principles of electrical filters.	1.86	.61
42.	Uses of synchr~systems.	1.86	.56
44.	Crystals as a source of electricity.	1.88	.61
45.	Theory of the sawtooth generator.	1.90	.85
47.	Nature of capacitive reactance.	1.93	.63
47.	Characteristics of parallel resonant circuits.	1.93	.61
47.	Uses of relays.	1.93	.58
49.5	Theory of operation of gas tubes.	1.94	.57
49.5	Concept of phase.	1.94	.71
51.	Theory of co-axial transmission lines.	1.95	.61
52.5	Methods of obtaining modulation.	1.96	.51
52.5	Theory of transmission lines.	1.96	.68
54.5	Synchr~ principles.	1.97	.53
54.5	Characteristics of the sine wave.	1.97	.89
57.5	Amplification factor of vacuum tubes.	1.98	.78
57.5	Types of voltage regulator circuits.	1.98	.70
57.5	Factors of distortion in amplification.	1.98	.68
57.5	Uses of voltage regulators.	1.98	.60
60.	Characteristics of transformers.	1.99	.45
62.	Theory of operation of transformer type amplifiers.	2.02	.72
62.	Waveforms and harmonics.	2.02	.68
62.	Properties of electrical conductors and insulators.	2.02	.81
64.	Principles of electromotive force.	2.03	.88
65.5	Transconductance of vacuum tubes.	2.05	.91
65.5	Theory of operation of klystrons.	2.05	.88
67.	Sources of D.C. voltage.	2.06	.86
68.5	Theory of the blocking oscillator.	2.07	.73
68.5	The theory of electron-coupled oscillators.	2.07	.83
70.	Nature of inductive reactance.	2.08	.82
71..	Types and uses of radar antennas.	2.09	.65
72.	Types of rectifiers.	2.10	.62
73.	Types of AVC circuits.	2.11	.69
74.	The effects of parasitic oscillations.	2.15	.79
75.	Units of electrical force, work, and power.	2.16	.52

Table 124 (continued)

Order	Item	Mdn*	Q
76.	Theory of operation of direct coupled amplifiers.	2.17	.80
77.5	Theory of the differentiating circuit.	2.19	.86
77.5	Basic motor and generator principles.	2.19	.84
79.	Interpretation of characteristics curves of vacuum tubes.	2.20	.77
80.	Theory of overdriven amplifier.	2.21	.89
81.	Theory of operation of T-R tubes.	2.27	.79
82.	Time constants.	2.28	.86
83.	Theory of the limiting circuit.	2.29	.76
84.5	Interelectrode capacitance of vacuum tubes.	2.30	.89
84.5	The theory of the Colpitts oscillator.	2.30	.81
86.5	The theory of the Hartley oscillator.	2.33	.90
86.5	Theory of operation of beam power tubes.	2.33	.96
89.	Structure and operation of relays.	2.35	.72
89.	Principles of regenerative and degenerative feed-back.	2.35	.76
89.	Internal plate resistance of vacuum tubes.	2.35	1.10
91.	Magnets as a source of electricity.	2.38	.68
93.	The theory of the tuned grid-tuned plate.	2.40	.79
93.	Circuit analysis of cathode ray oscilloscope.	2.40	.87
93.	Theory of the phase inverter.	2.40	.79
95.	The relative advantages of various types of transmission lines.	2.41	.90
96.	Theory of discriminator circuits.	2.42	.76
97.	Structure of vacuum tubes.	2.47	.90
99.	Theory of operation of light-house tubes.	2.53	.82
99.	Theory of neutralization.	2.53	.90
99.	Principles of static electricity.	2.53	.92
101.	Theory of operation of a transducer.	2.57	.93
102.	Moving-coil principle.	2.59	.88
103.	Details of the construction of ammeters, voltmeters, and ohmmeters.	2.62	1.06
104.	Theory of clamping circuits.	2.65	.78
105.	Structure and operation principles of various generator types.	2.68	.67
106.5	Theory of frequency modulated UHF oscillators.	2.77	.96
106.5	Skin effect.	2.77	.95
108.	Theory of operation of radar countermeasures.	2.78	.95
109.	Structure of capacitors.	2.79	.88
110.5	Concept of Q.	2.80	.95

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Table 124 (continued)

Order	Item	Mdn*	Q
110.5	Concept of power factor.	2.80	.76
112.	Structure and operation of circuit breakers.	2.81	.71
113.	Theory of sound.	2.82	.93
114.	Distributive capacitance.	2.84	.90
115.	Distributed inductance.	2.85	.77
116.	Uses of batteries.	2.88	.85
117.	Structure and operation of starting boxes.	2.89	.92
118.5	Concept of ionosphere.	2.93	.85
118.5	Properties of electro-magnets.	2.93	.77
120.5	Relationship between current and voltage in star transformer connections.	3.02	.83
120.5	Structure of inductors.	3.02	.85
122.	Types of headphones and speakers.	3.06	.93
123.	Theory of batteries.	3.07	1.08
124.	Structure of transformers.	3.08	.76
125.	Principles of watt meters.	3.13	.95
126.	Properties of permanent magnets.	3.14	.91
127.	The atomic nature of electricity.	3.17	1.24
128.	The theory of modes of wave guides.	3.21	1.10
129.5	The right-hand rule.	3.24	.94
129.5	Vector analysis of L, C, and R circuits.	3.24	1.05
131.	Thermo-electric sources of electricity.	3.26	.92
132.	Concept of decibels.	3.27	1.01
133.	Magnetic reluctance.	3.29	.88
134.	Relationship between current and voltage in delta transformer connections.	3.30	.77
135.	Theory of the phonotron.	3.34	.98
136.	The theory of the Armstrong oscillator.	3.36	.88
137.	Theory of the Doppler effect.	3.45	.81
138.	The theory of the Wein bridge oscillator.	3.54	.77
139.	Moving vane or plunger principle applied to meters.	3.57	.73
141.	Theory of operation of photo tubes.	3.62	.79
141.	Methods of care of batteries.	3.62	.87
141.	Units of mechanical force, work, and power.	3.62	.78
143.5	Concept of "E" and "H" lines of force in wave guides.	3.63	.90
143.5	Theory of operation of electric eye tubes.	3.63	.78
145.	Concept of phase velocity of wave guides.	3.73	1.04

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Table 125

Training Questionnaire

Median Ratings and Qs for the Performance Items of Training Questionnaire  
Arranged in Order of Median Value

Order	Item	Mdn*	Q
1.	Read schematic diagram.	1.02	.26
2.	Trace circuits of transmitters and receivers.	1.11	.30
3.	Perform exercises in trouble shooting.	1.13	.32
4.	Determine the function of various units within a circuit.	1.22	.42
5.5	Perform exercises in locating bad tubes.	1.23	.42
5.5	Trace signals inside receivers.	1.23	.42
7.	Align a superheterodyne receiver.	1.26	.47
8.	Calculate resistance, current, and voltage using Ohms law.	1.28	.48
9.	Perform exercises in locating bad resistors.	1.29	.48
10.	Perform exercises in the use of front panel indicators for locating areas of trouble.	1.33	.51
11.	Perform exercises in tuning various transmitters.	1.36	.52
12.	Memorize color codes.	1.37	.53
13.	Perform exercises in locating bad capacitor.	1.38	.60
14.	Determine direction of current flow.	1.41	.55
15.	Perform exercises in soldering.	1.42	.56
16.	Measure current (amps).	1.50	.70
17.	Calculate values in series circuits.	1.58	.63
18.	Perform exercises in tuning in frequencies of radio receivers.	1.65	.61
19.	Practice making various preventive maintenance checks on transmitters.	1.71	.67
20.	Perform exercises in taking ring time.	1.72	.65
21.	Perform exercises in chassis wiring.	1.85	.54
22.	Perform exercise in taking waveforms.	1.86	.70
23.5	Draw block diagrams of various radar equipment.	1.92	.73
23.5	Calculate values in combined series-parallel circuit.	1.92	.73
25.5	Measure power output of transmitters.	2.02	.80
25.5	Perform exercises with L-R frequency meter.	2.02	.79
27.	Perform familiarization exercise on oscilloscope.	2.13	.67
28.	Calibrate oscillator.	2.14	.77
29.5	Perform exercises in record keeping.	2.20	.82
29.5	Build a power supply.	2.20	.70

A median of 1.00 is highest possible value indicating maximum value for job proficiency.

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Table 125 (continued)

Order	Item	Mdn*	Q
31.	Perform exercises in adjusting transmission lines.	2.27	.77
32.	Build amplifier.	2.30	.82
33.	Calculate values in parallel circuits.	2.31	.86
34.	Construct a two-stage receiver.	2.35	.75
35.	Perform exercises in detecting and ranging on objects.	2.38	.97
36.	Compute inductance.	2.42	1.00
37.5	Build a multi-vibrator.	2.50	.85
37.5	Build a sawtooth generator.	2.50	.88
39.	Calculate values of meter shunts.	2.56	.91
40.	Perform exercises in measuring pulse width.	2.57	.74
41.	Construct a simple transmitter.	2.58	.81
42.	Measure A.C. impedance quantities.	2.61	.81
43.5	Plot selectivity curves of receivers.	2.62	.72
43.5	Compute average power output of a radar set.	2.62	.79
45.	Compute capacitance.	2.68	.86
46.	Convert frequency to wave length.	2.71	.97
47.5	Compute time for radar signal to reach target and return, knowing the distance it travels.	2.73	.32
47.5	Build a phase inverter.	2.73	.96
49.	Build a cathode follower.	2.74	.89
50.5	Build a differentiating circuit.	2.79	1.00
50.5	Calculate inductance of coils.	2.79	1.19
52.	Build a blocking oscillator.	2.79	.90
53.	Check for standing waves.	2.85	.77
54.5	Perform exercises in measuring standing wave ratio.	2.89	.90
54.5	Build a diode limiting circuit.	2.89	.91
56.	Build an audio oscillator.	2.93	1.01
57.	Determine power factor.	2.98	.76
58.	Plot antenna radiation.	3.08	.96
59.	Compute root mean square voltage.	3.13	1.04
60.	Plot tube characteristic curves.	3.26	.91
61.	Perform exercises in cleaning equipment.	3.28	.75
62.	Phase-out transformer.	3.31	.97
63.	Compute the Q of cavity resonators.	3.38	1.08
64.	Compute characteristic impedance of transmission lines.	3.43	1.02
65.	Construct a Wein bridge oscillator.	3.61	.89
66.	Construct A.C. meters.	3.68	.69

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Table 126 (continued)

Type of Gear	Nature of Trouble	Cause of Trouble	Front Panel Indication	Parts Tested	Test Equipment Used	Unavailable Equipment Needed	Tools Used
8. SA Radar	Equipment Inoperative, open circuits.	Age - wear.	No mtr current, no light.	Multi-conductor cables.	Volt-ohm-milliammeter.	No Response.	Sold. gun, screwdriver, diagonals, pliers.
9. SC-4 Radar	Open filament.	Apparently due to tube age.	No PPI sweep.	V-2100, (504-G vacuum tube)	TV-30 tube tester	None	None
10. VJ radar repeater	Loss of plate voltage.	Capacitor broke down under HV.	No PPI sweep.	T-501, R-525, C-508.	Ω - volt-ohm milliammeter, TS-34/UP oscilloscope.	None	Long nose flashlight, sold. gun.
11. VJ radar repeater	Jittery sweep on FPI.	Bleeder resistor defective.	Sweep was jumping, intensifier voltage low.	Bleeder resistor & tubes.	Ω - meter.	None	Screwdriver, sold. gun, pliers.
12. VJ radar repeater	Intermittent cathode, V-125 gaseous.	Age	No rotation of sweep on scope.	V-120, V-125	Tube tester	No Response	Screwdriver.
13. VT radar repeater	Gassy tube	Age of tube	B-scope blank.	Tube	Tube tester	None	Screwdriver.
14. VT-2 radar repeater	Bad tubes	Age of tubes	No response	Tubes	Tube tester	None	Screwdriver.

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Table 126

Equipment Repairs Recorded By ETs in the Repair Record

Type of Gear	Nature of Trouble	Cause of Trouble	Front Panel Indication	Parts Tested	Test Equipment Used	Unavailable Equipment Needed	Tools Used
1. SL-1 Radar	No sync. to start the sweep.	Tube shorted to shield.	None	Sweep from airsearch OK but not from SL-1.	Volt - ohm milliammeter.	None	Screwdriver pliers
2. SU Radar	No focusing control.	Broken focus control shaft.	Varying of focus control caused no charge.	L-503, R-674, R-675.	Ohmmeter	None	Sold. iron, pliers, file screwdriver, allen wrench.
3. SR Radar	Overflow of internal insulation of transformer.	Excessive heat due to bad filter.	No response.	T-101	OCR	None	Sold. gun, pliers, screwdriver, sockets.
4. SG-1b Radar	Leaky condenser.	High voltage breakdown.	Lack of high voltage noted.	C-109	Ohmmeter, capacity checker.	No Response.	Screwdriver, fuse puller.
5. SG-1b Radar	Loose roller on PPI yoke.	Wear & use.	Abnormal rotation of PPI sweep.	None	None	No Response.	Crescent wrench.
6. SG-1b Radar	Parts changing value.	Old Age.	No emitter current, no sweep.	All parts in unit.	OS/G-C, OE, OBQ scope.	None	Screwdriver, pliers, wrenches, short-bar.
7. SC-3 Radar	Intermittent pulsing.	Open resistors.	Intermittent pulsing.	V-303, T-301, OCR, T-303, R-304, multimeter.	T-315, R-313,	None	Short-bar, Screwdriver, test leads.

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Table 126 (continued)

Type of Gear	Nature of Trouble	Cause of Trouble	Front Panel Indication	Parts Tested	Test Equipment Used	Unavailable Equipment Needed	Tools Used
22. RAO-3 radio receiver	Varying beat frequency.	Socket prong holders lost springiness of contact.	Output on CW reception very erratic.	CW oscil-lator tube.	Audio osc., r.f. signal generator.	None	Pliers, screwdriver, sold. gun, flashlight.
23. RBB radio receiver	Low sensitivity.	Alignment off.	None	All	LP sig. gen, microameter.	Leads for LP sig. gen.	Aligning tools, pliers, screwdriver.
24. RBC radio receiver	No signal output from oscillator.	Amperite tube in cathode of osc. open.	Noise level but no signal received.	Tubes	Tube tester, ohmmeter.	None	None
25. TDZ radio transmitter	Power amp. stage dead.	Open lead.	No PA current.	Tube	Ohmmeter.	None	Screwdriver, pliers.
26. TDZ radio transmitter	No power output.	Lead shorting C-157 to chassis.	#1 cathode current abnormally high.	C-157, R-214.	OE analyzer.	None	Screwdriver.
27. TDZ radio transmitter	Weak output.	Dirty components and bad tubes.	Low grid & plate current in PA stage.	Coils, resistors, capacitors, xformer.	ME-1110, OH-9.	None	Pliers, screwdriver, wrenches.
28. TDZ radio transmitter	Loss of power output.	LV filter choke shorted to ground.	Output failing off and repeated over-load.	Tubes, filter chokes, filter & filter capacitors.	Circuit analyzer.	TDZ power supply schematic.	Sold, iron, screwdriver, wrenches.

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Table 126 (continued)

Type of Gear	Nature of Trouble	Cause of Trouble	Front Panel Indication	Parts Tested	Test Equipment Used	Unavailable Equipment Needed	Tools Used
15. Mk-25 Mod.2 radar fire control	Burned out resistor.	Probably shorted osc. tube.	No xtal current, unable to tune rcvr.	Resistor, capacitors, xtal checker.	Multimeter, None	Diagonals, screwdriver, allen wrench, sold. iron.	
16. Mk-25 Mod.2 radar fire control	Low xmitter current, erratic pulse	Bad keyer tube.	Low current drain on. xmitter current meter.	V-(3C)1 keyer tube.	Tube tester.	Monitor scope which is part of MK-25.	None
17. Mk-25 Mod.2 radar fire control	No video presentation.	Gassy tube.	Jumpy scope trace, 300V meter read incorrectly.	6T6G.	None	None	None
18. Mk-25 Mod.2 radar fire control	Resistor low in value, gassy tube.	Gassy tube pulled too much current thru resistor.	Jittery sweep.	R-71,R-72, V-9,V-10.	Multimeter, test scope.	None	Screwdriver, sold. gun.
19. AW/ARG-1 radio transmitter-receiver	Roller on inductor in PA and driver section.	Mishandling.	No driver grid current or PA grid current.	No response	None	None	Screwdriver.
20. RBS-2 radio receiver	No signals.	Antenna variable cap. dirty & short to ground.	None	Antenna former & capaci- tance.	Tube tester, VT-voltmeter, milliammeter.	Source of power when rcvr is moved.	Pliers, sold. gun, screwdriver.
21. RAO-7 radio receiver	Low sensitivity.	Short, phone jacks, tubes, xtal, out of alignment.	None	Resistors, capacitors, tubes, xformers.	LP, LM decibel meter VT voltmeter, sig. gen., osc.	Bristol wrenches. pliers, sold. iron, wrenches.	Screwdriver.

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Table 126 (continued)

Type of Gear	Nature of Trouble	Cause of Trouble	Front Panel Indication	Parts Tested	Test Equipment Used	Unavailable Equipment Needed	Tools Used
36. TCS-12 radio transmitter	Low output.	Gassy tubes.	Low drive—wouldn't load up.	None	Tube tester.	None	None
37. AM/ARC radio transmitter receiver	Could not turn equip. off.	Starting relay contacts stuck.	None	None	OH ohmmeter.	Schematic diagram of AM/ARC.	Screwdriver.
38. Speaker amplifier	Intermittent operation in adjusting vol. control.	Potentiometer contacts dirty.	None	Potentiometer.	Ohmmeter.	None	Knife, pliers, sold. iron, screwdriver.
39. AM/APR-1 RCM	Poor sensitivity.	Tube filament open.	None	Tubes.	Tube tester, signal gen.	Proper type of pliers & pencil soldering iron.	Screwdriver, sold. iron, pliers.
40. ME 11/0 test equipment	Bad statl.	Deterioration of statl.	No output.	None	None	No response	Pliers, vise, file, screwdriver.

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Table 126 (continued)

Type of Gear	Nature of Trouble	Cause of Trouble	Front Panel Indication	Parts Tested	Test Equipment Used	Unavailable Equipment Needed	Tools Used
29. TDZ radio transmitter	Low output.	Weak tubes and generally detuned.	Low grid & cathode readings on all channels.	None	RF wattmeter as dummy load antenna.	Tube tester.	Screwdriver.
30. TBS-5 radio transmitter	No output.	Low tube emission.	No grid current on 2nd doubler.	None	Multimeter.	None	None
31. TBS-5 radio transmitter	Low sensitivity & low signal to noise ratio.	Bad & gassy tubes, poor relay contact.	None	All tubes, switching relay.	Wiring diagram of antenna wiring.	ScREWDriver, pliers, wrench.	None
32. TBL-7 radio transmitter	Plate voltmeter gave incorrect reading.	Meter resistor increased in value.	Low reading on plate voltmeter.	Plate voltmeter, C-83 MCR.	OE analyzer, milliammeter.	None	Screwdriver, pliers.
33. TBL-13 radio transmitter	No drive to 1st intermediate amplifier.	No MO oscillations, dirty switch contacts.	1st amp. plate meter read high.	C-15,C-16, C-18,C-17, L-5.	Multimeter.	None	Screwdriver.
34. TBL-13 radio transmitter	No RF output.	Salt deposit on resistor, causing short.	All meter readings very low.	Resistors, capacitors.	Multimeters, resistance-capacity bridge.	None	Screwdriver, pliers, wrenches.
35. TCS radio transmitter	Power output varied.	Vibration loosened power leads.	Power output varied when unit keyed.	Tubes in transmitter	None	None	Socket wrench.

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The following tables contain information concerning the maintenance activities of the ratings of ET, SO, RD, RM, and FC. The activity statements for each of the tables are not presented with each table for the purpose of saving space. Each row of the tables is numbered and the numbers correspond to the activity statements listed below. The tables are read in the following manner:

In the first column, (N) ships reported on chiefs of a given rating. Of these (N) ships a proportion of (p) reported that the chiefs of the rating operate a radio receiver, a proportion of (p') of the (N) ships observed a chief of that rating adjust a radio receiver, etc.

The following are the activity statements that correspond to the numbered rows of the tables. The first fifteen statements relate to activities which may be performed in conjunction with major equipment. The last four statements relate to activities which may be performed on test equipment.

1. Operates
2. Adjusts
3. Calibrates
4. Shifts frequencies of
5. Measures sensitivity of
  
6. Measures selectivity of
7. Does preventive maintenance on
8. Makes minor repairs on
9. Diagnoses major casualties
10. Makes major repairs on
  
11. Supervises personnel performing preventive maintenance on
12. Trains personnel performing preventive maintenance on
13. Supervises personnel performing corrective maintenance on
14. Trains personnel performing corrective maintenance on
15. Superintends maintenance facilities for
  
  
16. Uses
17. Does preventive maintenance on
18. Repairs
19. Calibrates

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Table 127

Proportion of Ships on Which a Man of Each Rate in the Rating of Electronics Technician Was Reported to Perform Each of the Activities\* of the Check List with Regard to Major Equipment (as Reported by the Lead ETs)

N =	Radio Receiver					Radio Transmitter					Radar Equipment				
	8 C	7 1	9 2	16 3	16 SN	8 C	7 1	9 2	16 3	16 SN	8 C	7 1	9 2	16 3	16 SN
1.	.63	.57	.67	.69	.69	.63	.57	.67	.63	.50	.63	.57	.67	.75	.63
2.	.75	.71	.89	.94	.81	.63	.57	.89	.88	.81	.75	.71	.89	.94	.75
3.	.63	.86	.89	.75	.50	.50	.57	.67	.69	.50	.75	.86	.89	.81	.38
4.	.88	.57	.89	.81	.75	.75	.57	1.0	.88	.88	.38	.71	.67	.56	.44
5.	.38	.43	.67	.63	.38	.13	—	.11	.19	.19	.25	.29	.33	.31	.19
6.	.13	.43	.44	.31	.19	—	—	.11	.19	.13	—	.14	.22	.13	.13
7.	.50	.57	1.0	.75	.94	.50	.57	.89	.75	.88	.50	.57	1.0	.81	.75
8.	.25	.57	.89	.94	.94	.38	.57	.89	.94	.94	.50	.57	.89	.94	.94
9.	.75	.86	1.0	.88	.38	.75	.86	1.0	.88	.38	.75	.86	1.0	.69	.31
10.	.50	.86	1.0	.88	.38	.50	.86	1.0	.88	.31	.63	.86	1.0	.81	.31
11.	.75	.71	1.0	.50	.31	.75	.71	1.0	.56	.31	.75	.71	1.0	.56	.25
12.	.63	.71	.89	.50	.31	.63	.71	.78	.50	.25	.63	.71	.89	.56	.31
13.	.88	.86	.67	.38	—	.75	.86	.67	.38	—	.88	.86	.67	.38	—
14.	.75	.71	.78	.25	—	.63	.71	.67	.25	—	.75	.71	.78	.31	—
15.	.88	.71	.67	.38	—	.75	.71	.67	.31	—	.75	.71	.78	.31	—

For the definitions of the activities in these tables, see Appendix H in Report 2 of this series.

Table 128

Proportion of Ships on Which a Man of Each Rate in the Rating of Electronics Technician was Reported to Perform Each of the Activities\* of the Check List with Regard to Test Equipment (as Reported by the Lead ETs)

N =	Multimeter					Oscilloscope					Tube Tester				
	8 C	7 1	9 2	16 3	16 SN	8 C	7 1	9 2	16 3	16 SN	8 C	7 1	9 2	16 3	16 SN
16.	.75	.71	.89	.75	.88	.75	1.0	1.0	.88	.88	.88	1.0	1.0	.88	.94
17.	.25	.71	.67	.50	.44	.25	.57	.78	.56	.50	.25	.57	.67	.56	.50
18.	.38	.57	.67	.50	.13	.38	.57	.78	.50	.19	.38	.57	.78	.56	.25
19.	.38	.43	.22	.25	.06	.25	.43	.33	.25	.13	.25	.43	.33	.19	.13

For the definitions of the activities in these tables see Appendix H in Report 2 of this series.

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Table 127 (continued)

N	Sonar Equipment					Radio Teletype					Fire Control Gear				
	8 C	7 1	9 2	16 3	16 SN	8 C	7 1	9 2	16 3	16 SN	8 C	7 1	9 2	16 3	16 SN
.	.25	.71	.33	.25	.25	--	.43	.56	.31	.19	.38	.71	.33	.44	.63
.	.25	.71	.22	.25	.06	.25	.57	.78	.44	.31	.50	.71	.44	.63	.56
.	.25	.57	.33	.31	.13	.13	.43	.33	.13	.06	.38	.86	.44	.44	.19
.	.13	.57	.11	.13	.06	--	.43	.67	.31	.25	.38	.57	.33	.38	.31
.	--	.29	.22	.06	.06	--	.14	.22	.06	.06	.13	.29	.33	.31	.13
.	--	.29	.11	.06	.06	--	.29	.22	.06	.06	--	.14	.11	.13	.06
.	.13	.29	.22	.31	.19	.38	.43	.67	.56	.50	.38	.86	.44	.56	.56
.	.25	.43	.22	.50	.31	.38	.43	.78	.63	.56	.25	.57	.33	.63	.69
.	.63	.71	.22	.25	.06	.50	.43	.56	.44	.13	.50	.86	.44	.31	.25
.	.38	.71	.22	.31	.06	.50	.43	.56	.44	.13	.38	.86	.44	.44	.31
.	.38	.43	.22	.19	.13	.50	.43	.67	.44	.25	.38	.43	.33	.25	.25
.	.38	.71	.22	.31	.13	.50	.71	.56	.31	.19	.50	.71	.33	.38	.25
.	.50	.71	.11	.19	.06	.63	.57	.44	.31	--	.63	.86	.33	.31	--
.	.50	.71	.33	.25	--	.63	.43	.44	.31	--	.50	.71	.44	.38	--
.	.50	.57	.22	.19	--	.63	.57	.44	.25	--	.75	.71	.44	.25	--

Table 128 (continued)

N	Audio Oscillator					Signal Generator					Wattmeter				
	8 C	7 1	9 2	16 3	16 SN	8 C	7 1	9 2	16 3	16 SN	8 C	7 1	9 2	16 3	16 SN
.	.75	.71	.89	.75	.75	.75	.71	.89	.69	.75	.75	.71	.89	.75	.81
.	.25	.57	.56	.44	.56	.25	.57	.56	.44	.56	.25	.57	.44	.44	.44
.	.38	.57	.67	.44	.31	.38	.71	.67	.38	.25	.38	.71	.56	.38	.19
.	.38	.43	.33	.19	.13	.25	.29	.22	.19	.06	.25	.29	.11	.25	.06

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Table 129 (continued)

N =	Loran					RCM					IFF				
	8 C	7 1	9 2	16 3	16 SN	8 C	7 1	9 2	16 3	16 SN	8 C	7 1	9 2	16 3	16 SN
1.	.38	.29	.33	.50	.44	.13	.14	.22	.25	.19	.25	.29	.33	.44	.31
2.	.38	.71	.67	.81	.44	.13	.14	.11	.25	.19	.25	.71	.44	.63	.25
3.	.38	.86	.67	.88	.25	.13	.14	.22	.25	.13	.13	.43	.22	.31	.19
4.	.13	.29	.33	.38	.19	.13	.14	.22	.31	.13	.13	.43	.33	.38	.13
5.	.13	.29	.33	.31	.13	.13	—	.11	.25	.17	.25	.43	.22	.38	.13
6.	.13	.29	.22	.31	.13	.13	—	.11	.19	.13	—	.29	.22	.31	.19
7.	.25	.43	.44	.69	.50	.13	.14	.22	.31	.25	.13	.29	.33	.50	.44
8.	.38	.57	.67	.81	.56	.25	.14	.22	.31	.25	.25	.43	.44	.69	.31
9.	.63	.86	.67	.69	.13	.25	.14	.11	.31	.13	.38	.71	.33	.56	.19
10.	.50	.71	.67	.75	.19	.25	.14	.11	.25	.19	.38	.71	.33	.56	.19
11.	.63	.57	.56	.44	.19	.38	.14	.22	.25	.19	.50	.57	.56	.38	.25
12.	.63	.57	.56	.38	.13	.38	.14	.22	.25	.13	.50	.57	.44	.31	.19
13.	.88	.57	.44	.31	—	.38	.14	.22	.25	.06	.75	.57	.33	.38	.06
14.	.75	.71	.56	.38	—	.38	.14	.22	.25	.06	.63	.71	.44	.31	.06
15.	.75	.71	.44	.38	—	.38	.14	.11	.19	.06	.63	.71	.44	.31	.06

Table 130 (continued)

N =	Frequency Meter					Condenser Checker					Echo Box				
	8 C	7 1	9 2	16 3	16 SN	8 C	7 1	9 2	16 3	16 SN	8 C	7 1	9 2	16 3	16 SN
16.	.88	1.0	1.0	.88	.88	.75	.86	.78	.69	.56	.88	1.0	1.0	.88	.75
17.	.25	.57	.44	.31	.19	.25	.57	.56	.38	.50	.25	.57	.56	.50	.38
18.	.50	.71	.44	.44	.19	.38	.71	.67	.44	.25	.50	.43	.44	.31	.19
19.	.38	.29	.22	.19	.06	.25	.43	.22	.19	.06	.38	.29	.22	.19	.06

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SECURITY INFORMATION

Table 129 (continued)

N -	Infra-red					
	8 C	7 1	9 2	16 3	16 SN	
	--	.29	.11	.25	.19	
	--	.29	.11	.31	.13	
	--	--	--	.06	.06	
	--	--	--	.06	.06	
	--	--	--	.06	.06	
	--	--	--	.06	.06	
	--	--	--	.06	.06	
	--	.14	.11	.25	.19	
	.13	.29	.11	.31	.13	
	.13	.14	.11	.31	.13	
	.13	.14	.11	.31	.13	
	.25	.29	.11	.25	.19	
	.25	.29	.11	.19	.13	
	.13	.29	.11	.13	--	
	.13	.29	.11	.13	--	
	.25	.43	.11	.19	--	

Table 13C (continued)

N -	Signal Tracer					Wave Meter					Range Calibrator				
	8 C	7 1	9 2	16 3	16 SN	8 C	7 1	9 2	16 3	16 SN	8 C	7 1	9 2	16 3	16 SN
	.50	.43	.44	.31	.31	.75	.86	.56	.38	.38	.75	.71	.78	.50	.50
	.25	.43	.44	.25	.31	.25	.43	.21	.25	.25	.25	.57	.44	.44	.31
	.38	.43	.22	.19	.13	.25	.43	.21	.13	.13	.38	.57	.44	.25	.13
	.25	.29	.11	.13	--	.13	.43	.11	.13	--	.25	.29	.11	.13	--

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Table 131

Proportion of Ships on Which a Man of Each Rate in the Rating of Electronics Technician Was Reported to Perform Each of the Activities\* of the Check List with Regard to Major Equipment (as Reported by the Electronics Materiel Officers)

N =	Radio Receiver					Radio Transmitter					Radar Equipment				
	3 C	4 1	4 2	10 3	11 SN	3 C	4 1	4 2	10 3	11 SN	3 C	4 1	4 2	10 3	11 SN
1.	.33	.25	.25	.40	.36	.33	.25	.25	.40	.36	.33	.25	.25	.50	.45
2.	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	.91	1.0	1.0	1.0	1.0	.91
3.	.67	.75	.75	.90	.82	.67	.75	.75	.90	.64	1.0	1.0	1.0	1.0	.73
4.	.67	1.0	1.0	1.0	.91	.67	1.0	1.0	1.0	.91	.33	.75	.50	.50	.36
5.	.67	.50	.50	.80	.55	.33	.25	.25	.30	.18	.67	.75	.75	.60	.45
6.	.67	.50	.50	.50	.36	.33	.25	.50	.30	.18	—	—	.25	.10	.09
7.	.33	.75	.75	.90	.91	—	.75	.75	.90	.91	.33	.75	.75	.80	.73
8.	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	.91
9.	1.0	1.0	1.0	1.0	.45	1.0	1.0	1.0	1.0	.36	1.0	1.0	1.0	.90	.45
10.	1.0	1.0	1.0	.90	.55	1.0	1.0	1.0	.90	.36	1.0	1.0	1.0	.80	.36
11.	.67	1.0	1.0	.80	.36	.67	1.0	1.0	.80	.36	1.0	1.0	1.0	.80	.45
12.	1.0	1.0	1.0	.70	.27	1.0	1.0	1.0	.70	.27	1.0	1.0	1.0	.70	.45
13.	1.0	1.0	1.0	.80	—	1.0	1.0	1.0	.80	—	1.0	1.0	1.0	.70	.09
14.	1.0	1.0	1.0	.60	—	1.0	1.0	1.0	.50	—	1.0	1.0	1.0	.60	—
15.	.67	1.0	.50	.30	—	.67	1.0	.50	.30	—	.67	1.0	.50	.30	—

For the definitions of the activities in these tables see Appendix H in Report 2 of this series.

Table 132

Proportion of Ships on Which a Man of Each Rate in the Rating of the Electronics Technician Was Reported to Perform Each of the Activities\* of the Check List with Regard to Test Equipment (as Reported by the Electronics Materiel Officers)

N =	Multimeter					Oscilloscope					Tube Tester				
	3 C	4 1	4 2	10 3	11 SN	3 C	4 1	4 2	10 3	11 SN	3 C	4 1	4 2	10 3	11 SN
16.	1.0	1.0	1.0	.90	.91	1.0	1.0	1.0	.90	.52	1.0	1.0	1.0	.90	.91
17.	.33	.50	1.0	.60	.45	.33	.50	1.0	.80	.45	.33	.50	1.0	.80	.55
18.	1.0	.75	1.0	.60	.36	.67	.75	1.0	.70	.36	.67	.50	.75	.60	.45
19.	.33	—	.50	.30	.18	—	—	7.5	.40	.18	.33	—	.50	.20	.18

For the definitions of the activities in these tables see Appendix H in Report 2 of this series.

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Table 131 (continued)

N	Sonar Equipment					Radio Teletype					Fire Control Gear				
	3 C	4 1	4 2	10 3	11 SN	3 0	4 1	4 2	10 3	11 SN	3 C	4 1	4 2	10 3	11 SN
.33	.25	--	.20	.09	--	.25	.25	.40	.27	--	.50	.50	.40	.64	
.67	1.0	.25	.60	.09	.33	.75	.50	.80	.55	.33	1.0	.75	.80	.73	
.33	.75	--	.40	.09	.33	.75	.50	.80	.36	.33	1.0	.75	.70	.55	
--	--	--	--	--	--	.25	.50	.50	.27	--	.25	.50	.20	.27	
.33	.25	.25	.20	--	--	.25	.25	.30	.18	.33	.75	.50	.40	.27	
--	--	--	--	--	--	.50	.25	.30	.27	--	.25	--	.10	.09	
--	.50	.25	.20	.09	.33	.25	.50	.60	.45	--	.75	.75	.60	.55	
.33	.75	.25	.40	.18	.33	.75	.50	.80	.55	.33	1.0	.75	.80	.73	
1.0	1.0	.25	.40	--	.33	.75	.50	.70	.18	.33	1.0	.75	.60	.36	
.67	1.0	.25	.40	.18	.33	.50	.25	.40	.18	.33	1.0	.75	.40	.36	
.33	1.0	.25	.20	.09	.33	.75	.50	.60	.18	.33	1.0	.75	.50	.45	
.33	.75	.25	.30	.09	.33	.50	.50	.60	.09	.33	.75	.75	.40	.36	
.33	1.0	.25	.10	--	.33	.75	.50	.60	--	.33	1.0	.75	.50	.09	
.33	1.0	--	.20	--	.33	.75	.50	.40	--	.33	.75	1.0	.30	--	
.33	1.0	--	.20	--	.33	.75	.50	.30	--	.33	1.0	.50	.20	--	

Table 132 (continued)

N	Audio Oscillator					Signal Generator					Wattmeter				
	3 C	4 1	4 2	10 3	11 SN	3 C	4 1	4 2	10 3	11 SN	3 C	4 1	4 2	10 3	11 SN
.67	.50	.50	.60	.55	.67	.50	.50	.70	.73	.67	.50	.50	.60	.64	
.33	.25	.50	.40	.27	--	.25	.50	.50	.36	--	.25	.50	.40	.27	
.33	.25	.50	.20	.09	.33	.50	.50	.40	.18	--	.25	.50	.30	.27	
--	--	.25	.10	.09	--	--	.50	.10	.09	--	--	.25	.10	.09	

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Table 133 (continued)

N =	Loran						RCM						IFF					
	3 0	4 1	4 2	10 3	11 SN	3 C	4 1	4 2	10 3	11 SN	3 C	4 1	4 2	10 3	11 SN	3 C	4 1	4 2
1.	--	.25	.25	.30	.09	--	--	.25	.20	--	--	.50	.50	.40	.09			
2.	.67	.75	.75	.50	.36	--	--	.25	.20	.09	.67	1.0	.75	.50	.73			
3.	.33	.50	.50	.50	.36	--	--	.25	.20	--	.33	.75	.50	.50	.64			
4.	--	.25	.50	.30	.18	--	--	.25	.20	.09	--	.25	.50	.30	.09			
5.	.33	.50	.50	.40	.18	--	--	.25	.10	--	.33	.50	.25	.20	.09			
6.	--	.25	.25	.20	.09	--	--	.25	.10	--	--	.25	--	.10	--			
7.	.67	.75	.75	.70	.45	--	--	.25	.20	.18	.33	.75	.50	.60	.27			
8.	1.0	1.0	.75	.60	.55	--	--	.25	.20	.18	.67	1.0	.75	.60	.36			
9.	1.0	1.0	.75	.50	.27	--	--	.25	.20	--	.67	1.0	.50	.30	.09			
10.	.67	1.0	.75	.50	.18	--	--	.25	.20	.09	.67	1.0	.50	.30	--			
11.	.67	1.0	.75	.20	.09	--	--	.25	.20	.09	.67	1.0	.50	.20	.18			
12.	.67	1.0	.75	.40	.09	--	--	.25	.20	--	.67	1.0	.50	.30	.09			
13.	1.0	1.0	.75	.30	--	--	--	.25	.20	--	.67	1.0	.50	.10	--			
14.	.67	1.0	.75	.30	--	--	--	.25	--	--	.67	1.0	.50	.10	--			
15.	.33	1.0	.50	.20	--	--	--	.25	--	--	.33	1.0	.25	.10	--			

Table 134 (continued)

N =	Frequency Meter						Condenser Check						Echo Box					
	3 C	4 1	4 2	10 3	11 SN	3 C	4 1	4 2	10 3	11 SN	3 C	4 1	4 2	10 3	11 SN	3 C	4 1	4 2
16.	1.0	.75	.75	.80	.82	.33	.25	.50	.40	.45	1.0	1.0	1.0	.90	.91			
17.	--	.50	.75	.50	.45	--	.25	.50	.40	.36	.33	.50	1.0	.70	.55			
18.	.67	.50	.75	.30	.18	.33	.25	.50	.30	.09	.67	.75	.75	.30	.27			
19.	.33	.25	.50	.10	.09	.33	--	.25	.10	.18	--	--	.50	.30	.18			

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Table 133 (continued)

Table 134 (continued)

N	Signal Tracer					Wavemeter					Range Calibrator				
	3	4	4	10	11	3	4	4	10	11	3	4	4	10	11
	0	1	2	3	SN	0	1	2	3	SN	0	1	2	3	SN
	.33	--	--	.20	.09	.33	.50	.50	.30	.27	.67	--	.25	.20	.18
	--	--	--	.10	.09	--	--	.50	.30	.18	--	--	.25	--	--
	--	--	--	--	--	--	--	.50	.10	.09	--	--	.25	--	--
	--	--	--	--	--	--	--	.25	.10	.09	--	--	--	--	--

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Table 135

Proportion of Ships on Which a Man of Each Rate in the Rating of Sonarman Was Reported to Perform Each of the Activities\* of the Check List with Regard to Major Equipment

N =	Radio Receiver					Radio Transmitter					Radar Equipment				
	6 C	10 1	13 2	17 3	17 SN	6 C	10 1	13 2	17 3	17 SN	6 C	10 1	13 2	17 3	17 SN
1.	--	.10	.08	.06	.06	--	--	--	--	--	--	.10	.08	.06	--
2.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
13.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
14.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

\*For the definitions of the activities in these tables, see Appendix H in Report 2 of this series.

Table 136

Proportion of Ships on Which a Man of Each Rate in the Rating of Sonarman Was Reported to Perform Each of the Activities\* of the Check List with Regard to Test Equipment

N =	Multimeter					Oscilloscope					Tube Tester				
	6 C	10 1	13 2	17 3	17 SN	6 C	10 1	13 2	17 3	17 SN	6 C	10 1	13 2	17 3	17 SN
16.	.33	.70	.54	.41	.29	.17	.70	.31	.24	.06	.83	.80	.77	.76	.53
17.	--	.10	--	--	--	--	.10	--	--	--	--	.10	--	--	--
18.	--	.10	--	--	--	--	.10	--	--	--	.17	.10	--	--	--
19.	--	--	--	--	--	--	--	--	--	--	.17	--	--	.06	.06

\*For the definitions of the activities in these tables, see Appendix H in Report 2 of this series.

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Table 135 (continued)

N =	Sonar Equipment					Radio Teletype					Fire Control Gear				
	6 C	10 1	13 2	17 3	17 SN	6 C	10 1	13 2	17 3	17 SN	6 C	10 1	13 2	17 3	17 SN
	1.0	1.0	1.0	.94	1.0	--	--	--	--	--	--	--	--	--	--
	1.0	.90	.92	.94	.47	--	--	--	--	--	--	--	--	--	--
	.83	.90	.85	.71	.18	--	--	--	--	--	--	--	--	--	--
	1.0	.60	.62	.53	.18	--	--	--	--	--	--	--	--	--	--
	.50	.60	.54	.29	.06	--	--	--	--	--	--	--	--	--	--
	.50	.50	.23	.29	.12	--	--	--	--	--	--	--	--	--	--
	.50	.90	.85	.82	.71	--	--	--	--	--	--	--	--	--	--
	1.0	.90	.69	.76	.29	--	--	--	--	--	--	--	--	--	--
	.83	.90	.46	.35	.06	--	--	--	--	--	--	--	--	--	--
	.67	.90	.38	.18	--	--	--	--	--	--	--	--	--	--	--
	1.0	.90	.77	.35	--	--	--	--	--	--	--	--	--	--	--
	1.0	.90	.69	.29	.06	--	--	--	--	--	--	--	--	--	--
	.83	.90	.54	.18	--	--	--	--	--	--	--	--	--	--	--
	.83	.90	.54	.12	--	--	--	--	--	--	--	--	--	--	--
	.83	.70	.23	.12	--	--	--	--	--	--	--	--	--	--	--

Table 136 (continued)

N =	Audio Oscillator					Signal Generator					Wattmeter				
	6 C	10 1	13 2	17 3	17 SN	6 C	10 1	13 2	17 3	17 SN	6 C	10 1	13 2	17 3	17 SN
	.17	.50	.24	.18	--	.50	.60	.38	.29	--	--	.30	.08	--	--
	--	.10	--	--	--	--	.10	--	--	--	--	.10	--	--	--
	--	.10	--	--	--	--	.10	--	--	--	--	.10	--	--	--
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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Table 137 (continued)

N =	Loran					RCM					IFF				
	6 C	10 1	13 2	17 3	17 SN	6 C	10 1	13 2	17 3	17 SN	6 C	10 1	13 2	17 3	17 SN
1.	.17	--	--	--	--										
2.	--	--	--	--	--										
3.	--	--	--	--	--										
4.	--	--	--	--	--										
5.	--	--	--	--	--										
6.	--	--	--	--	--										
7.	--	--	--	--	--										
8.	--	--	--	--	--										
9.	--	--	--	--	--										
10.	--	--	--	--	--										
11.	--	--	--	--	--										
12.	--	--	--	--	--										
13.	--	--	--	--	--										
14.	--	--	--	--	--										
15.	--	--	--	--	--										

Table 138 (continued)

N =	Frequency Meter					Condenser Checker					Echo Box				
	6 C	10 1	13 2	17 3	17 SN	6 C	10 1	13 2	17 3	17 SN	6 C	10 1	13 2	17 3	17 SN
16.	.17	.50	.08	--	--	.17	.30	.27	.12	--	--	.10	--	--	--
17.	--	.10	--	--	--	--	.10	--	--	--	--	--	--	--	--
18.	--	.10	--	--	--	--	.10	--	--	--	--	--	--	--	--
19.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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Table 137 (continued)

		Intra-red				
N -	C	6	10	13	17	SN
		1	2	3	SN	
<hr/>						
Note: The Lead Sonarmen indicated that none of the men they supervised worked with Intra-red equipment.						

Table 138 (continued)

		Signal Tracer					Wave Meter					Range Calibrator				
N -	C	6	10	13	17	SN	6	10	13	17	SN	6	10	13	17	SN
		1	2	3	SN		C	1	2	3	SN	C	1	2	3	SN
		.30	.08	.12	--		.17	.10	.08	--	--		.10	--	--	--
		.10	--	--	--		--	--	--	--	--		--	--	--	--
		.10	--	--	--		--	--	--	--	--		--	--	--	--
		.10	--	--	--		--	--	--	--	--		--	--	--	--

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Table 139

Proportion of Ships on Which a Man of Each Rate in the Rating of Radarman Was Reported to Perform Each of the Activities\* of the Check List with Regard to Major Equipment

N -	Radio Receiver						Radio Transmitter						Radar Equipment						
	3 C	4 1	15 2	18 3	18 SN	3 C	4 1	15 2	18 3	18 SN	3 C	4 1	15 2	18 3	18 SN	3 C	4 1	15 2	18 3
1.	.33	.50	.67	.61	.67	.33	.25	.33	.28	.28	1.0	.75	.93	.94	1.0				
2.	--	.25	.27	.05	.17	--	--	--	.05	--	.33	.75	.60	.67	.56				
3.	--	--	.13	.11	.05	--	--	--	--	--	.33	.50	.73	.72	.67				
4.	.33	.25	.27	.33	.17	--	--	.07	.05	--	.33	--	.13	.11	.05				
5.	--	--	--	.05	--	--	--	--	.05	--	--	--	.20	.11	.11				
6.	--	--	.07	.11	--	--	--	--	.05	--	--	--	.07	.05	--				
7.	--	--	.20	.05	.17	--	--	--	--	.05	.33	.50	.80	.83	.89				
8.	--	--	.13	--	--	--	--	--	.05	--	--	.25	.27	.28	.11				
9.	--	--	.07	--	--	--	--	.07	--	--	--	--	.07	--	--				
10.	--	--	.07	--	--	--	--	--	--	--	--	--	.07	--	--				
11.	.33	--	.27	.11	.05	--	--	.07	--	--	1.0	1.0	.87	.28	.05				
12.	--	--	.20	.05	.05	--	--	.07	--	--	.67	.75	.73	.28	.05				
13.	--	--	.13	--	--	--	--	.07	--	--	--	--	.20	--	--				
14.	--	--	.13	--	--	--	--	.07	--	--	--	--	.20	--	--				
15.	--	--	.07	--	--	--	--	.07	--	--	--	.25	.20	.05	--				

For the definitions of the activities in these tables, see Appendix H in Report 2 of this series.

Table 140

Proportion of Ships on Which a Man of Each Rate in the Rating of Radarman Was Reported to Perform Each of the Activities\* of the Check List with Regard to Test Equipment

N -	Multimeter						Oscilloscope						Tube Tester						
	3 C	4 1	15 2	18 3	18 SN	3 C	4 1	15 2	18 3	18 SN	3 C	4 1	15 2	18 3	18 SN	3 C	4 1	15 2	18 3
16.	--	.25	.07	.05	--	--	.25	.07	.05	--	.33	.50	.27	.28	.17				
17.	--	--	--	--	.05	--	--	--	--	.05	--	--	--	--	--	--	--	.05	
18.	--	--	--	--	.05	--	--	--	--	.05	--	--	--	--	--	--	--	.05	
19.	--	--	--	--	.05	--	--	--	--	.05	--	--	--	--	--	--	--	.05	

For the definitions of the activities in these tables, see Appendix H in Report 2 of this series.

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Table 139 (continued)

N.	Sonar Equipment					Radio Teletype					Fire Control Gear				
	3 C	4 1	15 2	18 3	18 SN	3 C	4 1	15 2	18 3	18 SN	3 C	4 1	15 2	18 3	18 SN
1.	--	.25	.07	.11	.11	--	--	--	--	.05	--	.25	.07	--	--
	--	--	--	--	.05	--	--	--	--	.05	--	.25	--	--	--
	--	--	--	--	.05	--	--	--	--	.05	--	.25	--	--	--
	--	--	--	.05	--	--	--	--	--	--	--	.25	--	--	--
	--	--	--	--	.05	--	--	--	.05	--	--	.25	--	--	--
	--	--	--	--	--	--	--	--	--	--	--	.25	--	--	--
	--	--	--	--	--	--	--	--	--	--	--	.25	--	--	--
	--	--	--	.05	--	--	--	--	.05	--	--	.25	--	--	--
	--	.07	--	--	--	--	--	--	.05	--	--	.25	--	--	--
	--	--	--	--	--	--	--	--	.05	--	--	.25	--	--	--
	--	--	--	--	--	--	--	--	--	--	--	.25	--	--	--
	--	--	.07	--	--	--	--	.07	--	--	--	.25	--	--	--
	--	--	.07	--	--	--	--	.07	--	--	--	.25	--	--	--
	--	--	.07	--	--	--	--	.07	--	--	--	.25	--	--	--
	--	--	.07	--	--	--	--	.07	--	--	--	.25	--	--	--
	--	--	.07	--	--	--	--	.07	--	--	--	.25	--	--	--
	--	--	.07	--	--	--	--	.07	--	--	--	.25	--	--	--

Table 140 (continued)

N.	Audio Oscillator					Signal Generator					Wattmeter				
	3 C	4 1	15 2	18 3	18 SN	3 C	4 1	15 2	18 3	18 SN	3 C	4 1	15 2	18 3	18 SN
16.	--	--	.07	.05	--	--	.25	.07	.11	--	.33	.25	.07	.11	.05
17.	--	--	--	.05	--	--	--	--	--	.05	--	--	--	--	.05
18.	--	--	--	.05	--	--	--	--	.05	--	--	--	--	--	.05
19.	--	--	--	--	.05	--	--	--	.05	.05	--	--	--	--	.05

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Table 141 (continued)

N =	Loran					RCM					IFF				
	3 C	4 1	15 2	18 3	18 SN	3 C	4 1	15 2	18 3	18 SN	3 C	4 1	15 2	18 3	18 SN
1.	--	--	.13	--	--	.67	.50	.47	.50	.33	.67	.75	.87	.72	.44
2.	--	--	.07	--	--	.33	.25	.20	.28	.22	--	.25	.20	.17	.05
3.	--	--	--	--	--	.33	.25	.13	.22	.17	--	--	.07	.05	--
4.	--	--	--	--	--	.67	.25	.20	.28	.22	--	--	.07	.11	.05
5.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6.	--	--	--	--	--	--	--	--	.05	.05	--	--	--	--	--
7.	--	--	.13	.05	.05	--	--	.20	.22	.22	--	--	.27	.17	.22
8.	--	--	--	--	--	--	--	.07	.11	.17	--	--	.13	--	.05
9.	--	--	--	--	--	--	--	--	--	--	--	--	.13	--	--
10.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11.	--	--	.13	--	--	.33	.25	.20	.11	--	--	.25	.20	.11	.05
12.	--	--	.13	--	--	.33	--	.20	.11	--	--	.25	.20	.17	.05
13.	--	--	--	--	--	--	--	--	--	--	--	.07	--	--	--
14.	--	--	--	--	--	--	--	--	--	--	--	.07	--	--	--
15.	--	--	--	--	--	--	--	--	--	--	--	.07	.05	--	--

Table 142 (continued)

N =	Frequency Meter					Condenser Checker					Echo Box				
	3 C	4 1	15 2	18 3	18 SN	3 C	4 1	15 2	18 3	18 SN	3 C	4 1	15 2	18 3	18 SN
16.	--	.25	.20	.28	.17	--	--	.07	.05	--	--	.50	.67	.61	.28
17.	--	--	--	--	.05	--	--	--	--	.05	--	--	.07	--	.05
18.	--	--	--	--	.05	--	--	--	--	.05	--	--	.07	--	.05
19.	--	--	--	.05	.05	--	--	--	--	.05	--	--	--	.05	.05

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Table 141 (continued)

N -	Infra-red					
	3 C	4 1	15 2	18 3	18 SN	

Note: The Lead Radarman indicated that none of the men they supervised worked with Infra-red equipment.

Table 142 (continued)

N -	Signal Tracer					Wave Meter					Range Calibrator				
	3 C	4 1	15 2	18 3	18 SN	3 C	4 1	15 2	18 3	18 SN	3 C	4 1	15 2	18 3	18 SN
16.	--	--	.07	.05	--	--	--	.07	.11	--	--	.25	.20	.22	.11
17.	--	--	--	--	.05	--	--	--	--	.05	--	--	--	--	.05
18.	--	--	--	--	.05	--	--	--	--	.05	--	--	--	--	.05
19.	--	--	--	--	.05	--	--	--	--	.05	--	--	--	--	.05

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Table 143

Proportion of Ships on Which a Man of Each Rate in the Rating of Radioman Was Reported to Perform Each of the Activities\* of the Check List with Regard to Major Equipment

N -	Radio Receiver						Radio Transmitter						Radar Equipment					
	3 C	4 1	9 2	10 3	17 SN	3 C	4 1	9 2	10 3	17 SN	3 C	4 1	9 2	10 3	17 SN	3 C	4 1	9 2
1.	1.0	1.0	.89	1.0	.94	1.0	1.0	.89	1.0	.88	--	--	--	--	--	--	--	--
2.	.33	.75	.56	.60	.47	.67	.75	.67	.70	.41	--	--	--	--	--	--	--	--
3.	.67	.50	.44	.90	.53	.67	.75	.22	.80	.53	--	--	--	--	--	--	--	--
4.	1.0	.75	.67	.80	.82	1.0	.75	.67	.80	.76	--	--	--	--	--	--	--	--
5.	--	--	.11	.20	.12	--	--	--	.20	--	--	--	--	--	--	--	--	--
6.	--	--	.11	.30	.12	--	--	--	.20	--	--	--	--	--	--	--	--	--
7.	.67	.75	.78	.80	.88	.67	.50	.78	.70	.76	--	--	--	--	--	--	--	--
8.	.67	.50	.44	.40	.18	.67	.25	.22	.40	.18	--	--	--	--	--	--	--	--
9.	.67	.25	.11	.30	--	.67	.25	.11	.30	.06	--	--	--	--	--	--	--	--
10.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11.	1.0	.75	.89	.70	.24	1.0	.75	.89	.70	.24	--	--	--	--	--	--	--	--
12.	1.0	.50	.78	.50	.29	1.0	.50	.78	.50	.29	--	--	--	--	--	--	--	--
13.	.33	.25	.22	.30	.06	.33	--	.22	.30	.06	--	--	--	--	--	--	--	--
14.	.33	.25	.22	.30	.06	.33	--	.22	.30	.06	--	--	--	--	--	--	--	--
15.	.33	--	.22	.10	--	.33	--	.22	.10	--	--	--	--	--	--	--	--	--

\* For the definitions of the activities in these tables, see Appendix H in Report 2 of this series.

Table 144

Proportion of Ships on Which a Man of Each Rate in the Rating of Radioman Was Reported to Perform Each of the Activities\* of the Check List with Regard to Test Equipment

N -	Multimeter						Oscilloscope						Tube Tester					
	3 C	4 1	9 2	10 3	17 SN	3 C	4 1	9 2	10 3	17 SN	3 C	4 1	9 2	10 3	17 SN	3 C	4 1	9 2
16.	.33	.25	--	--	--	--	.25	--	--	--	1.0	.75	.56	.60	.35	--	--	--
17.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
19.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

\* For the definitions of the activities in these tables, see Appendix H in Report 2 of this series.

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Table 143 (continued)

N =	Sonar Equipment					Radio Teletype					Fire Control Gear				
	3 C	4 1	9 2	10 3	17 SN	3 C	4 1	9 2	10 3	17 SN	3 C	4 1	9 2	10 3	17 SN
	--	--	--	--	--	1.0	1.0	.78	.80	.76	--	--	--	--	--
	--	--	--	--	--	.67	.25	.33	.40	.35	--	--	--	--	--
	--	--	--	--	--	.33	.25	.22	.60	.24	--	--	--	--	--
	--	--	--	--	--	--	.25	.11	.30	.41	--	--	--	--	--
	--	--	--	--	--	--	--	--	.10	.06	--	--	--	--	--
	--	--	--	--	--	--	--	--	.10	.06	--	--	--	--	--
	--	--	--	--	--	.67	.25	.67	.70	.41	--	--	--	--	--
	--	--	--	--	--	.67	.25	.33	.40	.29	--	--	--	--	--
	--	--	--	--	--	.67	.25	.11	.10	.06	--	--	--	--	--
	--	--	--	--	--	.33	--	.11	--	--	--	--	--	--	--
	--	--	--	--	--	1.0	.25	.67	.30	.12	--	--	--	--	--
	--	--	--	--	--	1.0	.25	.44	.20	.18	--	--	--	--	--
	--	--	--	--	--	.33	--	.11	.10	--	--	--	--	--	--
	--	--	--	--	--	.33	--	.11	.10	--	--	--	--	--	--
	--	--	--	--	--	.33	--	.22	.10	--	--	--	--	--	--

Table 144 (continued)

N =	Audio Oscillator					Signal Generator					Wattmeter				
	3 C	4 1	9 2	10 3	17 SN	3 C	4 1	9 2	10 3	17 SN	3 C	4 1	9 2	10 3	17 SN
	.33	.25	.22	.30	.24	--	--	--	--	--	.33	.25	.11	.10	.13
	.33	.25	.22	.20	.12	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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Table 145 (continued)

		Infra-red									
N	-	3	4	9	10	17					
C		1	2	3	SN						
Note:	The Lead Radiomen indicated that none of the men they supervised worked with Infra-red equipment.										

Table 146 (continued)

		Signal Tracer					Wave Meter					Range Calibrator				
N	-	3	4	9	10	17	3	4	9	10	17	3	4	9	10	17
C		1	2	3	SN		C	1	2	3	SN	C	1	2	3	SN
Note:	The Lead Radiomen indicated that none of the men they supervised worked with Signal Tracer, Wave Meter, or Range Calibrator equipment.															

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Table 147

Proportion of Ships on Which a Man of Each Rate in the Rating of Fire Controlman Was Reported to Perform Each of the Activities\* of the Check List with Regard to Major Equipment

N -	Radio Receiver					Radio Transmitter					Radar Equipment				
	8 C	6 1	8 2	14 3	16 SN	8 C	6 1	8 2	14 3	16 SN	8 C	6 1	8 2	14 3	16 SN
1.	--	--	--	--	--	--	--	--	--	--	.33	.38	.50	.44	
2.	--	--	--	--	--	--	--	--	--	--	.17	.38	.50	.19	
3.	--	--	--	--	--	--	--	--	--	--	.17	.38	.43	.06	
4.	--	--	--	--	--	--	--	--	--	--	--	--	.07	--	
5.	--	--	--	--	--	--	--	--	--	--	.17	.25	.29	.06	
6.	--	--	--	--	--	--	--	--	--	--	.17	.13	.07	--	
7.	--	--	--	--	--	--	--	--	--	--	.17	.38	.43	.06	
8.	--	--	--	--	--	--	--	--	--	--	.17	.38	.50	.12	
9.	--	--	--	--	--	--	--	--	--	--	.17	.38	.29	--	
10.	--	--	--	--	--	--	--	--	--	--	--	.13	.14	--	
11.	--	--	--	--	--	--	--	--	--	--	.17	.38	.29	--	
12.	--	--	--	--	--	--	--	--	--	--	.17	.38	.36	--	
13.	--	--	--	--	--	--	--	--	--	--	.17	.38	.21	--	
14.	--	--	--	--	--	--	--	--	--	--	.17	.38	.21	--	
15.	--	--	--	--	--	--	--	--	--	--	.17	.13	.14	--	

For the definitions of the activities in these tables, see Appendix H in Report 2 of this series.

Table 148

Proportion of Ships on Which a Man of Each Rate in the Rating of the Fire Controlman Was Reported to Perform Each of the Activities\* of the Check List with Regard to Test Equipment

N -	Multimeter					Oscilloscope					Tube Tester				
	8 C	6 1	8 2	14 3	16 SN	8 C	6 1	8 2	14 3	16 SN	8 C	6 1	8 2	14 3	16 SN
16.	.25	.50	.13	.36	.13	.38	.67	.25	.43	--	.50	.67	.75	.86	.19
17.	--	.17	.13	.07	--	--	.17	.13	.07	--	--	.17	.13	.07	.06
18.	--	--	--	.07	--	--	--	--	.14	--	--	.17	--	.07	--
19.	--	--	--	.07	--	--	.17	.13	.14	--	.13	.17	.13	.07	--

For the definitions of the activities in these tables, see Appendix H in Report 2 of this series.

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Table 147 (continued)

N -	Sonar Equipment					Radio Teletype					Fire Control Gear				
	8 C	6 1	8 2	14 3	16 SN	8 C	6 1	8 2	14 3	16 SN	8 C	6 1	8 2	14 3	16 SN
--	--	.13	.07	--		--	--	--	--		.88	.83	.75	.79	.88
--	--	.13	.07	--		--	--	--	--		1.0	.83	.88	.71	.50
--	--	.13	.07	--		--	--	--	--		.63	1.0	.75	.50	.19
--	--	--	--	--		--	--	--	--		.25	.33	--	.29	--
--	--	--	--	--		--	--	--	--		.13	.50	.13	.21	--
--	--	--	--	--		--	--	--	--		.25	.50	.13	.21	--
--	--	.13	.07	--		--	--	--	--		.75	.83	.75	.86	.69
--	--	.13	.07	--		--	--	--	--		.75	.83	.75	.86	.75
--	--	.13	.07	--		--	--	--	--		.88	.83	.63	.43	.13
--	--	.13	--	--		--	--	--	--		.75	.67	.50	.50	.06
--	--	.13	--	--		--	--	--	--		.75	.83	.75	.64	--
--	--	.13	--	--		--	--	--	--		.75	.83	.88	.64	--
--	--	.13	--	--		--	--	--	--		.75	.83	.88	.36	--
--	--	.13	--	--		--	--	--	--		.75	.83	.88	.43	--
--	--	--	--	--		--	--	--	--		.50	.67	.13	.36	--

Table 148 (continued)

N -	Audio Oscillator					Signal Generator					Wattmeter				
	8 C	6 1	8 2	14 3	16 SN	8 C	6 1	8 2	14 3	16 SN	8 C	6 1	8 2	14 3	16 SN
--	.17	--	.07	--		.13	.17	.13	.14	--	.13	.17	.25	.07	--
--	--	--	.07	--		--	--	--	.07	--	--	--	--	--	
--	--	--	.07	--		--	--	--	.07	--	--	--	--	--	
--	--	--	.07	--		--	--	.13	.14	--	--	--	.13	.07	--

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Table 149 (continued)

N #	Loran					RCM					IFF				
	8 C	6 1	8 2	14 3	16 SN	8 C	6 1	8 2	14 3	16 SN	8 C	6 1	8 2	14 3	16 SN

Note: The Lead Fire Controlmen indicated that none of the men they supervised worked with Loran, RCM, or IFF equipment.

Table 150 (continued)

N #	Frequency Meter					Condenser Checker					Echo Box				
	8 C	6 1	8 2	14 3	16 SN	8 C	6 1	8 2	14 3	16 SN	8 C	6 1	8 2	14 3	16 SN
16.	.13	.17	--	.29	--	.13	.33	.25	.21	--	--	.33	.25	.36	.0
17.	--	--	--	.07	--	--	--	--	.07	--	--	.17	.13	.07	--
18.	--	--	--	.07	--	--	--	--	.07	--	--	--	--	.07	--
19.	--	--	--	.07	--	--	--	--	.07	--	--	--	--	.07	--

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Table 149 (continued)

N =	Infra-red														
	8 C	6 1	8 2	14 3	16 SN	8 C	6 1	8 2	14 3	16 SN	8 C	6 1	8 2	14 3	16 SN

Note: The Lead Fire Controlmen indicated that none of the men they supervised worked with Infra-red equipment.

Table 150 (continued)

N =	Signal Tracer					Wave Meter					Range Calibrator				
	8 C	6 1	8 2	14 3	16 SN	8 C	6 1	8 2	14 3	16 SN	8 C	6 1	8 2	14 3	16 SN
.13	.17	--	.07	--	--	--	.17	--	.07	--	--	.17	--	.07	--
--	--	--	.07	--	--	--	--	--	.07	--	--	--	.07	--	--
--	--	--	.07	--	--	--	--	--	.07	--	--	--	.07	--	--
--	--	--	.07	--	--	--	--	--	.07	--	--	--	.07	--	--

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Table 151

Proportion of Ships on Which a Man of Each Rate in the Rating of Electronics Technician Was Reported to Perform Each of the Activities\* of the Check List With Regard to Miscellaneous Duties (as Reported by Lead ETs)

Duties	N =	Rates				
		8 C	7 1	9 2	16 3	16 SN
1. Uses common hand tools		.88	1.0	1.0	.88	.94
2. Calibrates range of fire control radar		.63	.86	.33	.38	.19
3. Aligns fire control radars in train and elevation using optics		.25	.14	.11	.19	--
4. Orders replacement parts		.63	.86	.78	.69	.50
5. Maintains records of electronic equipment		.88	.86	.67	.64	.44
6. Prepares job orders		.88	.71	.67	.31	--
7. Prepares work orders		.88	.71	.67	.25	--
8. Treats a man for burns		.25	.43	.44	.31	.44
9. Repairs pressure type transmission lines		--	.29	.11	.25	.06
10. Locates stores and/or parts		.38	.86	.78	.56	.81
11. Accounts for stores or parts		.63	.57	.56	.50	.50
12. Draws block diagrams		.63	.71	.56	.44	.25
13. Refers to block diagrams		1.0	.86	.89	.88	.69
14. Draws circuit wiring diagrams		.75	.86	.44	.50	.44
15. Refers to circuit wiring diagrams		1.0	1.0	1.0	.94	.81

\* For definitions, see Appendix H in Report 2 of this series.

Table 152

Proportion of Ships on Which a Man of Each Rate in the Rating of Sonarman Was Reported to Perform Each of the Activities\* of the Check List with Regard to Miscellaneous Duties

Duties	N =	Rates				
		6 C	10 1	13 2	17 3	17 SN
1. Uses common hand tools		.83	.90	.85	.82	.88
2. Calibrates range of fire control radar		--	--	--	--	--
3. Aligns fire control radars in train and elevation using optics		--	--	--	--	--
4. Orders replacement parts		.67	.70	.54	.35	.12
5. Maintains records of electronic equipment		.67	.60	.62	.65	.24
6. Prepares job orders		.67	.60	.46	.24	.06
7. Prepares work orders		.67	.70	.62	.24	.12
8. Treats a man for burns		.50	.20	.31	.35	.29
9. Repairs pressure type transmission lines		--	--	--	--	--
10. Locates stores and/or parts		.33	.60	.38	.41	.24
11. Accounts for stores or parts		.33	.20	.08	.12	.06
12. Draws block diagrams		.67	.80	.38	.29	.12
13. Refers to block diagrams		.83	.90	.77	.59	.18
14. Draws circuit wiring diagrams		.67	.50	.31	.29	.06
15. Refers to circuit wiring diagrams		.83	.80	.69	.59	.29

\* For definitions, see Appendix H in Report 2 of this series. RESTRICTED

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Table 153

Proportion of Ships on Which a Man of Each Rate in the Rating of Radarman Was Reported to Perform Each of the Activities\* of the Check List With Regard to Miscellaneous Duties

Duties	Rates					
	N	3	4	15	16	18
C	1	2	3	3	SN	
1. Uses common hand tools	.33	.75	.73	.67	.7	
2. Calibrates range of fire control radar	--	.25	--	--	--	
3. Aligns fire control radars in train and elevation using optics	--	.25	--	--	--	
4. Orders replacement parts	--	--	.07	.11	--	
5. Maintains records of electronic equipment	--	.50	.20	.22	.1	
6. Prepares job orders	.67	.50	.47	.22	.0	
7. Prepares work orders	.33	.50	.40	.33	.0	
8. Treats a man for burns	--	.50	.33	.22	.1	
9. Repairs pressure type transmission lines	--	--	--	.05	--	
10. Locates stores and/or parts	--	.50	.27	.28	.0	
11. Accounts for stores or parts	--	.50	.07	.22	.1	
12. Draws block diagrams	--	.25	.20	.11	--	
13. Refers to block diagrams	.33	.50	.27	.11	--	
14. Draws circuit wiring diagrams	--	--	.07	.05	--	
15. Refers to circuit wiring diagrams	.33	.25	.27	.11	--	

\*For definitions, see Appendix H in Report 2 of this series.

Table 154

Proportion of Ships on Which a Man of Each Rate in the Rating of Radioman Was Reported to Perform Each of the Activities\* of the Check List With Regard to Miscellaneous Duties

Duties	Rates					
	N	3	4	9	10	17
C	1	2	3	3	SN	
1. Uses common hand tools	.67	.75	.67	.80	.7	
2. Calibrates range of fire control radar	--	--	--	--	--	
3. Aligns fire control radars in train and elevation using optics	--	--	--	--	--	
4. Orders replacement parts	--	--	.22	.10	.0	
5. Maintains records of electronic equipment	--	--	.22	.20	.1	
6. Prepares job orders	.67	.75	.22	.30	.0	
7. Prepares work orders	--	.25	.11	.10	--	
8. Treats a man for burns	.67	.50	.33	.60	.0	
9. Repairs pressure type transmission lines	--	--	--	--	--	
10. Locates stores and/or parts	--	.25	.11	--	.0	
11. Accounts for stores or parts	--	.25	.11	.10	.0	
12. Draws block diagrams	.33	.25	.11	--	.0	
13. Refers to block diagrams	.33	.25	.11	--	--	
14. Draws circuit wiring diagrams	.33	.25	--	--	.0	
15. Refers to circuit wiring diagrams	.33	.25	.11	--	--	

\*For definitions, see Appendix H in Report 2 of this series.

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Table 155

Proportion of Ships on Which a Man of Each Rate in the Rating of Fire Controlman Was Reported to Perform Each of the Activities\* of the Check List with Regard to Miscellaneous Duties

Duties	Rates					
	N = 8 C	6 1	8 2	14 3	16 SN	
1. Uses common hand tools	.75	.67	.63	.71	.81	
2. Calibrates range of fire control radar	.25	.33	.75	.50	.06	
3. Aligns fire control radars in train and elevation using optics	.63	.83	.63	.64	.19	
4. Orders replacement parts	.25	.50	.75	.43	.19	
5. Maintains records of electronic equipment	.13	.50	.63	.43	.06	
6. Prepares job orders	.50	.67	.63	.21	—	
7. Prepares work orders	.38	.83	.50	.29	—	
8. Treats a man for burns	.13	.33	.25	.21	.06	
9. Repairs pressure type transmission lines	.25	.33	.38	.29	—	
10. Locates stores and/or parts	.38	.50	.63	.64	.44	
11. Accounts for stores or parts	.38	.67	.50	.50	.19	
12. Draws block diagrams	.25	.67	.50	.29	—	
13. Refers to block diagrams	.75	.67	.75	.64	.44	
14. Draws circuit wiring diagrams	.25	.67	.38	.29	.06	
15. Refers to circuit wiring diagrams	.75	.67	.75	.79	.44	

For definitions, see Appendix H in Report 2 of this series.

Table 156

Proportion of Ships on Which a Man of Each Rate in the Rating of Electronics Technician Was Reported to Perform Each of the Activities\* of the Check List With Regard to Miscellaneous Duties (as Reported by Electronics Materiel Officers)

Duties	Rates					
	N = 3 C	4 1	4 2	10 3	11 SN	
1. Uses common hand tools	1.0	1.0	1.0	.80	.82	
2. Calibrates range of fire control radar	.67	.75	.75	.30	.36	
3. Aligns fire control radars in train and elevation using optics	.33	.50	.50	—	—	
4. Orders replacement parts	1.0	.75	.75	.70	.55	
5. Maintains records of electronic equipment	1.0	.50	.50	.60	.55	
6. Prepares job orders	1.0	.75	.50	.10	.09	
7. Prepares work orders	1.0	.75	.50	.20	.09	
8. Treats a man for burns	.33	.50	.50	.40	.36	
9. Repairs pressure type transmission lines	—	.25	.25	.10	—	
10. Locates stores and/or parts	.67	1.0	1.0	.80	.73	
11. Accounts for stores or parts	.67	.75	.75	.70	.45	
12. Draws block diagrams	1.0	.75	.75	.60	.55	
13. Refers to block diagrams	.67	1.0	1.0	.80	.82	
14. Draws circuit wiring diagrams	.67	.50	.50	.60	.45	
15. Refers to circuit wiring diagrams	1.0	1.0	1.0	.80	.82	

For definitions, see Appendix H in Report 2 of this series. ~~RESTRICTED~~

The following list consists of the job statements employed as items in the Card Sorting Technique. Each item was printed on the face of an individual 3 X 5 inches card. The numbers serve a reference function only. Gaps in the number series indicate items eliminated during the try out phase of the study. An asterisk (\*) precedes each statement that was in the Alpha sub-deck.

- 1 Replace variable capacitors.
- 2 Synchronize PPI sweeps in preventive maintenance.
- 3 \*Adjust range mark gating multivibrator.
- 4 \*Replace magnetron tubes.
- 5 Replace coils.
- 7 Rebuild generators.
- 8 \*Lubricate bearings.
- 9 \*Rebuild electric motors.
- 10 \*Replace automatic tuning head.
- 11 Adjust pulse frequency.
- 12a Vary (set) pulse width.
- 13a\*Replace crystal oven.
- 14 Replace servo motors.
- 15 \*Repair amplitidyne.
- 16 \*Adjust range marker amplitude.
- 17a\*Adjust sensitivity of range spot on PPI scope.
- 18 Adjust zero set on range scope.
- 19 Adjust local oscillator coupling.
- 20 Adjust bias of transmitter timing thyratron.
- 21a\*Calibrate range markers according to fixed range.
- 22a\*Adjust number of pulses of range mark multivibrator.
- 24 Tune TR box.
- 25 \*Adjust antenna coupling.
- 26a Adjust unblanking voltage.
- 27a Manually tune cavity resonator.
- 28a\*Adjust silencer or "squelch" voltage.
- 29 \*Adjust noise limiter.
- 30a\*Adjust relay points.
- 31 \*Replace tuning motor.
- 32 \*Replace potentiometers.
- 33a Replace electronically operating keying relays.
- 34 \*Install communications transmitter.
- 35a Neutralize or balance power of amplifier stage by neutralizing capacitor.
- 36a Assemble cross-connecting plugs for coaxial cables.
- 37 Match impedance in double slug transmission line.

TABLE 157

ELECTRONICS TECHNICIANS

Sort A

Frequency of ETs (by rate) selecting items that describe their job

Item No.	C (3)	1 (6)	2 (7)	3 (28)	SN (22)	Tot. (66)
----------	----------	----------	----------	-----------	------------	--------------

1	2	4	4	13	12	35
2a	1	4	4	10	5	24
3	3	4	2	14	7	30
4	3	6	4	22	17	52
5	3	5	4	20	13	45

7	0	1	0	5	4	10
8	2	6	4	21	15	48
9	0	3	0	3	4	10
10	1	4	1	2	2	10
11	3	5	2	15	9	34

12a	2	3	3	13	11	32
13a	2	4	4	14	7	31
14	3	5	2	8	4	22
15	1	4	1	4	4	14
16	3	6	3	17	11	40

17a	3	6	4	20	15	48
18	2	6	4	18	19	49
19	2	6	2	15	11	36
20	1	3	2	6	4	16
21a	2	5	3	12	12	34

22a	2	4	4	14	11	35
24	3	6	4	20	17	50
25	3	5	5	24	19	56
26a	2	5	3	13	11	34
27a	3	6	3	17	13	42

28a	3	6	5	19	14	47
29	3	5	4	22	19	53
30a	3	5	4	18	12	42
31	1	2	1	5	4	13
32	3	6	4	24	20	57

33a	2	4	2	14	13	35
34	0	1	0	3	3	7
35a	3	4	1	7	6	21
36a	2	3	4	10	9	28
37	2	3	1	4	5	15

Sort B

Frequency and Percentage of ETs (by rate) selecting items that "best" describe job

Item No.	C (3)	1 (6)	2 (7)	3 (28)	SN (22)	Tot. (66)
----------	----------	----------	----------	-----------	------------	--------------

1	2	67	4	67	3	43
2a	1	33	4	67	3	43
3	3	100	4	67	2	29
4	3	100	6	100	5	71
5	3	100	4	67	4	57

7	0	0	1	17	0	0
8	2	67	6	100	3	43
9	0	0	1	17	0	0
10	1	0	2	33	0	0
11	3	100	5	83	2	29

12a	0	0	3	50	2	29
13a	1	33	3	50	0	0
14	1	33	4	67	0	0
15	0	0	3	50	0	0
16	3	100	5	83	3	43

17a	3	100	4	67	2	29
18	2	67	6	100	3	43
19	2	67	6	100	2	29
20	1	33	3	50	0	0
21a	2	33	5	83	3	43

22a	1	33	4	67	1	14
24	3	100	6	100	4	57
25	3	100	5	83	5	71
26a	1	33	4	67	1	14
27a	3	100	6	100	3	43

28a	2	67	5	83	4	57
29	3	100	5	83	3	43
30a	3	100	4	67	2	29
31	0	0	1	17	0	0
32	3	100	6	100	5	71

33a	1	33	3	50	2	29
34	0	0	0	0	0	0
35a	1	33	3	50	1	14
36a	2	67	2	33	2	29
37	1	33	2	33	0	0

ELECTRONICS TECHNICIANS

Sort C

Percentage of ENs placing items  
that describe their jobs into 4  
categories of "Where Learned."

Item All Rates Combined (66)  
No. Shore School Formal Shipbd. Infor. Self-  
Shipbd. Instr.

Sort D

Percentage of ENs placing items that  
describe their jobs into 5 categories  
of "How Often Done."

All Rates Combined (66)  
Very Seldom Occas. Often Very  
Seld. Seld. Often Often

1	21	0	11	9	9	12	18	0	2
2a	3	2	14	11	3	8	11	8	0
3	11	2	14	12	9	9	14	6	0
4	12	4	42	15	6	27	26	15	2
5	32	2	12	12	11	17	21	8	2
7	0	0	2	2	0	3	0	0	0
8	15	3	11	35	2	9	26	21	6
9	0	0	3	2	3	2	0	0	0
10	0	0	3	4	3	3	2	0	0
11	12	4	12	11	6	12	14	8	2
12a	12	0	11	6	0	21	6	2	0
13a	11	0	11	6	8	9	6	3	2
14	0	0	8	3	4	8	2	0	0
15	0	0	4	6	3	6	2	0	0
16	12	3	17	15	4	11	21	8	3
17a	17	3	20	11	2	9	26	14	0
18	24	3	20	17	4	12	24	15	8
19	17	2	15	11	3	3	17	17	4
20	3	2	6	6	3	2	11	2	0
21a	8	6	20	8	3	9	15	12	2
22a	17	0	14	11	6	9	12	14	0
24	21	3	33	12	2	15	24	24	4
25	48	2	23	4	2	6	20	32	18
26a	3	2	17	11	2	12	12	3	3
27a	17	3	27	6	0	11	33	6	3
28a	11	0	24	18	4	2	15	20	12
29	21	2	24	21	6	4	26	21	11
30a	11	0	24	20	2	14	24	12	3
31	0	0	3	3	4	2	0	0	0
32	48	0	17	20	3	12	42	21	6
33a	3	0	24	9	3	18	15	0	0
34	0	0	4	0	0	2	3	0	0
35a	12	2	6	2	6	6	11	2	0
36a	6	0	11	12	9	4	9	6	0
37	8	0	3	2	0	4	6	2	0

TABLE 159

ELECTRONICS TECHNICIANS

Percentage of ETs (combined rates) placing items of Alpha and Beta subdecks in categories of amount of Comprehension and Amount of Skill Required, using the categories of: (1)Very little (2)Some (3)Moderate (4)Much (5)Very much

Item No.	Comprehension(for each subdeck 31)					Skill(for each subdeck 31)				
	1	2	3	4	5	1	2	3	4	5
1	10	26	55	10	0	6	39	45	10	0
2a	3	13	35	45	3	0	26	42	26	6
3 *	0	0	32	48	19	0	6	48	29	16
4 *	10	13	45	29	3	0	26	52	23	0
5	10	23	52	16	0	6	39	42	13	0
7	3	19	35	19	23	0	10	13	58	19
8 *	65	29	6	0	0	39	45	13	3	0
9 *	0	32	32	23	13	0	10	29	39	23
10 *	6	10	35	39	10	0	6	45	39	10
11	0	10	23	48	19	0	19	42	32	6
12a	0	6	19	61	13	0	26	32	39	3
13a*	6	39	52	3	0	3	58	32	6	0
14	3	23	35	29	10	3	19	48	19	10
15 *	0	10	16	48	26	0	6	35	35	23
16 *	10	16	48	23	3	6	26	55	10	3
17a*	3	16	35	42	3	3	13	65	16	3
18	6	23	45	23	3	0	32	55	13	0
19	0	0	39	58	3	0	10	52	32	6
20	3	3	29	55	10	0	6	35	48	10
21a*	0	6	52	35	6	0	19	42	32	6
22a*	0	0	32	58	10	0	10	55	19	16
24	0	10	58	29	3	3	13	52	26	6
25 *	3	16	55	19	6	0	39	48	13	0
26a	3	16	39	32	10	3	13	45	32	6
27a	3	13	42	35	6	0	19	45	32	3
28a*	3	23	48	23	3	6	39	42	13	0
29 *	0	16	52	29	3	6	39	42	13	0
30a*	0	13	55	29	3	0	32	39	19	10
31 *	10	29	39	16	6	0	26	48	23	3
32 *	6	35	52	6	0	13	48	32	6	0
33a	6	13	42	39	0	6	13	48	26	6
34 *	3	16	26	39	16	6	10	23	42	19
35a	0	0	29	52	19	0	3	42	39	16
36a	6	45	32	16	0	10	45	35	10	0
37	0	3	32	45	19	0	6	48	42	3

TABLE 160

COMPARISON

Sort A

Sort B

Frequency of SOs (by rate) selecting items that describe their job

Frequency and Percentage of SOs (by rate) selecting items that "best" describe job

Item No.	C (3)	1 (7)	2 (21)	3 (26)	Tot. (57)	0 f %	1 f %	2 f %	3 f %	Tot. (57) f %
1	1	1	12	9	23	- - -	1	14	8 38	5 19
2a	-	-	4	3	7	- - -	-	4 19	3 12	7 12
3	-	-	1	-	1	- - -	-	- - -	- - -	- - -
4	-	-	1	1	2	- - -	-	- - -	- - -	- - -
5	1	3	6	5	15	- - -	.3	43 4 19	3 12	10 18
7	-	-	-	-	--	-	-	-	-	-- --
8	3	7	18	13	41	2	67	6	86 16 34	10 38
9	-	-	--	--	--	- - -	-	- - -	- - -	-- --
10	-	-	--	--	--	- - -	-	- - -	- - -	- - -
11	2	2	7	3	14	1	33	2	29 3 14	1 04
12a	-	4	5	3	12	- - -	2	29	4 19	2 08
13a	-	-	-	1	1	- - -	-	- - -	- - -	- - -
14	1	2	8	4	15	- - -	2	29	5 24	2 08
15	-	-	1	-	1	- - -	-	- - -	- - -	- - -
16	-	-	2	1	3	- - -	-	2 10	1 04	3 05
17a	-	-	5	7	12	- - -	-	5 24	6 23	11 19
18	1	2	8	8	19	- - -	2	29	6 29	7 27
19	-	2	4	1	7	- - -	-	1 05	1 04	2 04
20	-	-	2	1	3	- - -	-	2 10	2 08	4 07
21a	-	-	4	2	6	- - -	-	3 14	3 12	6 11
22a	-	-	1	--	1	- - -	-	- - -	- - -	- - -
24	-	-	1	--	1	- - -	-	- - -	- - -	- - -
25	-	1	--	--	1	- - -	-	- - -	- - -	- - -
26a	1	0	3	2	6	1	33	-	2 10	2 08
27a	-	-	--	1	1	- - -	-	- - -	- - -	- - -
28a	-	1	--	--	1	- - -	-	- - -	- - -	- - -
29	-	1	2	4	7	- - -	-	-	1 05	5 19
30a	1	6	11	9	27	1	33	5 71	8 38	8 31
31	-	-	--	--	--	- - -	-	- - -	- - -	- - -
32	3	7	16	9	35	2	67	6 86	12 57	7 27
33a	2	6	14	8	30	2	67	5 71	10 48	5 19
34	-	1	--	1	2	- - -	-	- - -	- - -	- - -
35a	-	1	--	3	4	- - -	-	- - -	1 04	1 02
36a	-	-	2	1	3	- - -	-	- - -	- - -	- - -
37	-	-	2	--	2	- - -	-	- - -	- - -	- - -

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TABLE 161

SONARMEN

Sort C

Percentage of SOs placing items  
that describe their jobs into 4  
categories of "Where Learned."

Item All Rates Combined(57)  
No. Shore Formal Infor. Self-  
School Shipbd. Shipbd. Instr.

	All Rates Combined(57)	All Rates Combined (57)				Very Often
		Seldom	Occas.	Often		
1	16	--	5	4	4	2
2a	11	--	2	--	--	7
3	--	--	--	--	--	--
4	--	--	--	--	--	--
5	12	--	4	2	5	2
7	--	--	--	--	--	--
8	21	4	18	18	5	14
9	--	--	--	--	--	--
10	--	--	--	--	--	--
11	4	--	4	5	2	5
12a	2	--	9	4	4	4
13a	--	--	—	--	--	--
14	9	--	5	2	11	5
15	--	--	--	--	--	--
16	2	--	2	2	--	2
17a	9	—	4	7	2	4
18	14	2	7	4	5	12
19	4	--	—	--	--	—
20	4	--	—	--	5	2
21a	4	--	2	5	--	4
22a	--	--	--	--	--	--
24	--	--	--	--	--	--
25	--	--	--	--	--	--
26a	9	--	--	--	2	2
27a	—	--	--	--	--	--
28a	--	--	--	--	--	--
29	5	2	2	2	2	7
30a	16	2	14	7	5	9
31	--	--	--	--	--	--
32	39	2	5	2	7	25
33a	21	--	14	4	12	11
34	--	--	--	--	--	--
35a	--	--	2	--	2	--
36a	--	--	--	--	--	--
37	--	--	--	--	--	--

Sort D

Percentage of SOs placing items that  
describe their jobs into 5 categories  
of "How Often Done."

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TABLE 162

RADARMEN

Sort A-Frequency of RDs selecting items that describe their job.

Sort B-Frequency and Percentage of RDs selecting items that "best" describe job.

Sort C-Percentage of RDs placing items that describe jobs into four categories of "Where Learned"(1)ShoreSchool(2)FormalShipbd.(3)Inf.Shipbd.(4)Self-Instr.

Sort D-Percentage of RDs placing items that describe their jobs into five categories of "How Often Done."(1)VerySeldom(2)Seldom(3)Occas.(4)Often(5)VeryOften

Item No.	Sort A All Rates Comb.(21)	Sort B All Rates Comb.(21)	Sort C				Sort D								
			All Rates	Comb.(21)	1	2	3	4	All Rates	Comb.(21)	1	2	3	4	5
1	3	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2a	3	1	5	--	--	--	5	--	5	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8	6	4	19	10	5	5	--	--	--	5	5	10	--	--	--
9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11	8	4	19	10	--	10	--	--	5	--	10	--	5	--	--
12a	3	3	14	10	5	--	--	--	--	--	10	5	--	--	--
13a	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
14	--	--	--	--	--	--	5	--	--	--	--	--	--	--	--
15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
16	5	1	5	--	5	--	--	--	--	5	--	--	--	--	--
17a	15	10	48	24	5	19	--	--	10	5	5	19	10	--	--
18	11	6	29	5	5	19	--	--	5	5	5	10	10	--	--
19	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
21a	9	6	29	10	5	14	--	--	5	5	5	5	10	--	--
22a	1	1	5	5	--	--	--	--	--	--	--	5	--	--	--
24	2	1	5	--	--	5	--	--	--	--	--	5	--	--	--
25	2	1	5	5	--	--	--	--	--	--	--	5	--	--	--
26a	1	--	--	--	--	--	--	--	--	--	--	5	--	--	--
27a	2	1	5	--	--	5	--	--	--	--	--	--	--	--	--
28a	3	2	10	--	--	10	--	--	--	--	--	--	10	--	--
29	6	3	14	5	--	10	--	--	--	--	5	--	10	--	--
30a	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
31	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
32	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
33a	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
35a	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
36a	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
37	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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TABLE 163

## RADIOMEN

Sort A-Frequency of RMs selecting items that describe their job.  
Sort B-Frequency and Percentage of RMs selecting items that "best" describe job.  
Sort C-Percentage of RMs placing items that describe jobs into four categories of "Where Learned"(1)ShoreSchool(2)FormalShipbd.(3)Inf.Shipbd.(4)Self-Instr.  
Sort D-Percentage of RMs placing items that describe their jobs into five categories of "How Often Done."(1)VerySeldom(2)Seldom(3)Occas.(4)Often(5)VeryOften.

Item No.	Sort A		Sort B		Sort C				Sort D					
	All Rates Comb.(20)	All Rates Comb.(20)	All Rates Comb.(20)	All Rates Comb.(20)	1	2	3	4	All Rates Comb.(20)	1	2	3	4	5
1	1	--	--	--	--	--	--	--	--	--	--	--	--	--
2a	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8	5	3	15	5	--	5	5	--	--	--	10	5	--	--
9	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12a	--	--	--	--	--	--	--	--	--	--	--	--	--	--
13a	3	1	5	--	--	5	--	--	--	--	--	5	--	--
14	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15	--	--	--	--	--	--	--	--	--	--	--	--	--	--
16	--	--	--	--	--	--	--	--	--	--	--	--	--	--
17a	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18	--	--	--	--	--	--	--	--	--	--	--	--	--	--
19	4	3	15	--	--	10	5	--	--	5	--	10	--	--
20	--	--	--	--	--	--	--	--	--	--	--	--	--	--
21a	--	--	--	--	--	--	--	--	--	--	--	--	--	--
22a	--	--	--	--	--	--	--	--	--	--	--	--	--	--
24	--	--	--	--	--	--	--	--	--	--	--	--	--	--
25	13	10	50	5	10	25	--	--	5	--	--	15	30	--
26a	--	--	--	--	--	--	--	--	--	--	--	--	--	--
27a	--	--	--	--	--	--	--	--	--	--	--	--	--	--
28a	6	4	20	--	--	15	5	--	--	5	10	5	--	--
29	12	12	60	--	--	30	30	--	--	10	20	15	15	--
30a	1	--	--	--	--	--	--	--	--	--	--	--	--	--
31	--	--	--	--	--	--	--	--	--	--	--	--	--	--
32	1	--	--	--	--	--	--	--	--	--	--	--	--	--
33a	--	--	--	--	--	--	--	--	--	--	--	--	--	--
34	2	--	--	--	--	--	--	--	--	--	--	--	--	--
35a	2	--	--	--	--	--	--	--	--	--	--	--	--	--
36a	--	--	--	--	--	--	--	--	--	--	--	--	--	--
37	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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CARD SORT ITEMS

- 38a Install or repair ordinary communications cables.  
39 Install coaxial cables.  
41 \*Install wave guides.  
42 Install communications receivers.  
43 \*Compute Q of tuned band pass.  
  
44 \*Compute Q of cavity resonator.  
45 Check antenna for binding.  
46 \*Lubricate FPI slip rings.  
47a\*Clean duplexer with solvents.  
48a Drain coaxial transmission lines.  
  
49 \*Dry out wave guide.  
50 Wind coil.  
51 Compute distributed capacitance.  
52 Calibrate multimeters.  
53a Measure interelectrodes capacitance by means of tube checker.  
  
54a\*Measure capacity of capacitor.  
55 Compute capacitive reactance.  
56 Compute power factor.  
58a\*Clean or polish ferruled resistors.  
59a\*Check tube for gaseous breakdown by meter.  
  
60 \*Repair ohmmeter.  
60a Solder loose connections and replace parts in multimeters.  
62a\*Determine radio frequency that will obtain maximum distance of transmission.  
63 Measure output frequency of radio transmitter.  
64 Compute induction loss of RF line.  
  
65 \*Check crystals.  
66a Replace quartz crystals in the crystal unit.  
67 \*Measure decibels of power.  
68a\*Calculate output impedance of transmitter.  
69a\*Calculate impedance of resonant circuit.  
  
70 \*Use panoramic adaptor to determine frequency.  
70b Match impedance of transmission lines other than with slugs.  
71 \*Match impedance of transmission line.  
72 Repair cooling system fans and lines in electronic gear.  
73 \*Instruct personnel in safety precautions.

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CARD SORT ITEMS

- 38a Install or repair ordinary communications cables.
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- 44 \*Compute Q of cavity resonator.
- 45 Check antenna for binding.
- 46 \*Lubricate PPI slip rings.
- 47a\*Clean duplexer with solvents.
- 48a Drain coaxial transmission lines.
- 49 \*Dry out wave guide.
- 50 Wind coil.
- 51 Compute distributed capacitance.
- 52 Calibrate multimeters.
- 53a Measure interelectrods capacitance by means of tube checker.
- 54a\*Measure capacity of capacitor.
- 55 Compute capacitive reactance.
- 56 Compute power factor.
- 58a\*Clean or polish ferruled resistors.
- 59a\*Check tube for gaseous breakdown by meter.
- 60 \*Repair ohmmeter.
- 60a Solder loose connections and replace parts in multimeters.
- 62a\*Determine radio frequency that will obtain maximum distance of transmission.
- 63 Measure output frequency of radio transmitter.
- 64 Compute induction loss of RF line.
- 65 \*Check crystals.
- 66a Replace quartz crystals in the crystal unit.
- 67 \*Measure decibels of power.
- 68a\*Calculate output impedance of transmitter.
- 69a\*Calculate impedance of resonant circuit.
- 70 \*Use panoramic adaptor to determine frequency.
- 70b Match impedance of transmission lines other than with slugs.
- 71 \*Match impedance of transmission line.
- 72 Repair cooling system fans and lines in electronic gear.
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- 44 \*Compute Q of cavity resonator.
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- 46 \*Lubricate PPI slip rings.
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- 48a Drain coaxial transmission lines.
  
- 49 \*Dry out wave guide.
- 50 Wind coil.
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- 52 Calibrate multimeters.
- 53a Measure interelectrods capacitance by means of tube checker.
  
- 54a\*Measure capacity of capacitor.
- 55 Compute capacitive reactance.
- 56 Compute power factor.
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- 59a\*Check tube for gaseous breakdown by meter.
  
- 60 \*Repair ohmmeter.
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- 70 \*Use panoramic adaptor to determine frequency.
- 70b Match impedance of transmission lines other than with slugs.
- 71 \*Match impedance of transmission line.
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CARD SORT ITEMS

- 38a Install or repair ordinary communications cables.
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- 45 Check antenna for binding.
- 46 \*Lubricate PPI slip rings.
- 47a\*Clean duplexer with solvents.
- 48a Drain coaxial transmission lines.
- 49 \*Dry out wave guide.
- 50 Wind coil.
- 51 Compute distributed capacitance.
- 52 Calibrate multimeters.
- 53a Measure interelectrods capacitance by means of tube checker.
- 54a\*Measure capacity of capacitor.
- 55 Compute capacitive reactance.
- 56 Compute power factor.
- 58a\*Clean or polish ferruled resistors.
- 59a\*Check tube for gaseous breakdown by meter.
- 60 \*Repair ohmmeter.
- 60a Solder loose connections and replace parts in multimeters.
- 62a\*Determine radio frequency that will obtain maximum distance of transmission.
- 63 Measure output frequency of radio transmitter.
- 64 Compute induction loss of RF line.
- 65 \*Check crystals.
- 66a Replace quartz crystals in the crystal unit.
- 67 \*Measure decibels of power.
- 68a\*Calculate output impedance of transmitter.
- 69a\*Calculate impedance of resonant circuit.
- 70 \*Use panoramic adaptor to determine frequency.
- 70b Match impedance of transmission lines other than with slugs.
- 71 \*Match impedance of transmission line.
- 72 Repair cooling system fans and lines in electronic gear.
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CARD SORT ITEMS

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- 43 \*Compute Q of tuned band pass.
  
- 44 \*Compute Q of cavity resonator.
- 45 Check antenna for binding.
- 46 \*Lubricate PPI slip rings.
- 47a\*Clean duplexer with solvents.
- 48a Drain coaxial transmission lines.
  
- 49 \*Dry out wave guide.
- 50 Wind coil.
- 51 Compute distributed capacitance.
- 52 Calibrate multimeters.
- 53a Measure interelectrods capacitance by means of tube checker.
  
- 54a\*Measure capacity of capacitor.
- 55 Compute capacitive reactance.
- 56 Compute power factor.
- 58a\*Clean or polish ferruled resistors.
- 59a\*Check tube for gaseous breakdown by meter.
  
- 60 \*Repair ohmmeter.
- 60a Solder loose connections and replace parts in multimeters.
- 62a\*Determine radio frequency that will obtain maximum distance of transmission.
- 63 Measure output frequency of radio transmitter.
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- 67 \*Measure decibels of power.
- 68a\*Calculate output impedance of transmitter.
- 69a\*Calculate impedance of resonant circuit.
  
- 70 \*Use panoramic adaptor to determine frequency.
- 70b Match impedance of transmission lines other than with slugs.
- 71 \*Match impedance of transmission line.
- 72 Repair cooling system fans and lines in electronic gear.
- 73 \*Instruct personnel in safety precautions.

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TABLE 164

ELECTRONICS TECHNICIANS

Sort A

Frequency of ETs (by rate) selecting items that describe their job

Item No.	C	1 (3)	2 (6)	3 (7)	SN (22)	Tot. (66)
----------	---	----------	----------	----------	------------	--------------

38a	2	6	3	19	14	44
39	1	3	3	19	14	40
41	-	-	1	1	2	4
42	-	1	2	9	8	20
43	1	1	-	2	1	5

44	1	-	-	--	1	
45	3	4	2	14	5	28
46	2	1	1	4	4	12
47a	1	3	1	11	3	19
48a	1	1	-	7	3	12

49	1	3	2	8	7	21
50	-	1	-	3	2	6
51	-	-	-	4	1	5
52	1	1	1	4	7	14
53a	-	-	2	3	6	11

54a	3	6	4	16	17	46
55	1	4	1	9	7	22
56	1	1	1	2	4	9
58a	1	5	4	14	4	28
59a	2	4	4	19	15	44

60	1	5	3	14	13	36
60a	2	6	5	14	12	39
62a	-	1	-	6	2	9
63	2	5	4	10	11	32
64	1	-	-	--	1	2

65	3	5	5	21	22	56
66a	1	2	4	11	12	30
67	2	3	1	10	7	23
68a	1	1	-	3	6	
69a	1	3	1	6	6	17

70	1	2	2	4	3	12
70b	1	2	1	5	2	11
71	1	3	1	10	7	22
72	2	4	2	13	5	26
73	3	5	4	16	6	34

Sort B

Frequency and Percentage of ETs (by rate) selecting items that "best" describe job

	C (3)	1 (6)	2 (7)	3 (28)	SN (22)	Tot. (66)
--	----------	----------	----------	-----------	------------	--------------

38a	2	67	6	100	1	14
39	-	---	2	33	1	14
41	-	---	-	--	-	--
42	-	---	-	--	2	7
43	-	---	-	--	-	-

44	-	---	-	--	-	--
45	3	100	3	50	1	14
46	1	33	1	17	-	4
47a	1	33	3	50	-	8
48a	1	33	1	17	-	3

49	-	---	2	33	-	4
50	-	---	1	17	-	1
51	-	---	-	--	-	1
52	1	33	-	--	1	14
53a	-	---	-	--	1	14

54a	2	67	6	100	3	43
55	-	---	3	50	-	2
56	-	---	-	--	-	7
58a	1	33	3	50	1	14
59a	2	67	4	67	5	71

60	1	33	2	33	3	43
60a	1	33	5	83	4	57
62a	-	---	-	--	-	-
63	1	33	5	83	5	71
64	1	-	-	--	-	--

65	3	100	5	83	4	57
66a	1	33	2	33	4	57
67	-	---	3	50	1	14
68a	-	---	-	--	-	-
69a	1	-	1	17	-	-

70	-	---	1	17	-	3
70b	-	---	2	33	-	11
71	1	33	2	33	-	8
72	1	33	2	33	-	8
73	3	100	5	83	4	57

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SECURITY INFORMATION

TABLE 165  
ELECTRONICS TECHNICIANS

Sort C

Percentage of ETs placing items that describe their jobs into 4 categories of "Where Learned."

Item No.	All Rates Combined (66)	Shore School	Formal Infor.	Self-Shipbd.	Shipbd. Instr.
----------	-------------------------	--------------	---------------	--------------	----------------

Item No.	All Rates Combined (66)	All Rates Combined (66)					Very Often
		Very Seld.	Seldom	Occas.	Often		
38a	14	--	18	9	8	4	27
39	3	--	14	9	3	12	9
41	--	--	--	--	--	--	--
42	--	--	4	2	--	3	--
43	2	--	--	--	2	--	--
44	--	--	--	--	--	--	--
45	2	--	11	15	3	6	17
46	2	--	6	3	4	2	3
47a	--	--	9	6	2	8	3
48a	2	--	6	2	2	8	--
49	2	--	9	4	6	8	--
50	--	2	--	3	3	2	--
51	--	2	--	2	2	2	--
52	8	--	4	--	2	4	2
53a	9	--	--	3	--	6	3
54a	26	3	11	9	2	18	8
55	9	2	--	2	1	4	--
56	2	--	--	3	2	2	--
58a	8	--	9	11	2	6	6
59a	33	3	15	8	2	11	15
60	11	2	4	17	6	15	--
60a	17	2	8	18	12	15	6
62a	2	--	2	--	2	--	2
63	23	3	11	4	2	6	15
64	--	--	--	--	--	--	--
65	15	2	33	14	3	17	27
66a	11	--	23	4	4	2	11
67	12	4	3	3	2	4	6
68a	3	--	2	--	--	3	2
69a	6	--	--	2	3	2	--
70	3	--	2	3	--	4	3
70b	8	--	--	2	--	4	--
71	12	--	3	3	2	6	--
72	--	--	8	11	4	3	--
73	14	11	6	12	2	2	2

Sort D

Percentage of ETs placing items that describe their jobs into 5 categories of "How Often Done."

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TABLE 166  
ELECTRONICS TECHNICIANS

Percentage of ETs (combined rates) placing items of Alpha and Beta subdecks in categories of Amount of Comprehension and Amount of Skill Required, using the categories of: (1)Very little (2)Some (3)Moderate (4)Much (5)Very much

Item No.	Comprehension(for each subdeck 31)					Skill(for each subdeck 31)				
	1	2	3	4	5	1	2	3	4	5
38a	16	42	35	6	--	16	29	52	--	3
39	19	23	39	16	3	13	19	45	19	3
41 *	16	19	32	19	13	--	26	39	23	13
42	6	29	19	42	3	16	13	29	32	10
43 *	--	3	10	71	16	--	16	48	23	13
44 *	3	3	16	55	23	--	23	32	29	16
45	35	39	26	--	--	29	33	29	3	--
46 *	23	39	26	13	--	23	45	26	3	3
47a*	--	35	19	13	--	35	32	29	3	--
48a	32	35	23	10	--	29	32	35	3	--
49 *	42	32	19	3	3	26	39	32	--	3
50	13	19	23	29	16	6	16	23	35	19
51	--	--	13	42	45	10	6	26	48	10
52	3	3	10	61	23	--	10	16	32	42
53a	--	13	55	29	3	3	32	48	16	--
54a*	6	26	61	6	--	3	42	42	10	3
55	--	10	32	42	16	6	26	45	16	6
56	--	10	32	42	16	6	16	48	29	--
58a*	55	32	6	6	--	58	29	10	3	--
59a*	--	35	48	13	3	6	55	26	10	3
60 *	--	6	42	35	16	--	10	32	48	10
60a	6	39	39	16	--	--	26	42	32	--
62a*	--	6	10	45	39	--	10	26	48	16
63	3	10	58	23	6	3	29	42	16	10
64	--	--	10	35	55	3	3	13	48	32
65 *	6	23	58	13	--	3	42	48	6	--
66a	13	35	29	16	6	13	39	23	10	16
67 *	--	3	52	35	10	--	35	42	19	3
68a*	--	3	16	52	29	--	13	42	32	13
69a*	--	10	45	32	13	--	23	52	16	10
70 *	3	6	29	42	19	--	26	45	13	16
70b	--	--	16	39	45	--	6	26	48	19
71 *	6	3	13	58	19	--	6	48	39	6
72	32	45	23	--	--	10	35	55	--	--
73 *	6	19	35	23	16	16	23	32	26	3

TABLE 167

SONARMEIN

### **Sort A**

### **Sort B**

Frequency of SOs (by rate) selecting items that describe their job      Frequency and Percentage of SOs (by rate) selecting items that "best" describe job

Item No.	C	1	2	3	Tot. (57)	f	0	1	2	3	Tot. (57)
	(3)	(7)	(21)	(26)			(3)	%	(7)	(21)	
38a	3	3	6	1	13	-	-	1	14	2 10	1 04
39	-	-	3	1	4	-	-	-	-	-	-
41	-	-	--	--	--	-	-	-	-	-	-
42	-	1	--	--	1	-	-	-	-	-	-
43	-	-	--	--	--	-	-	-	-	-	-
44	-	-	--	--	--	-	-	-	-	-	-
45	-	-	--	--	--	-	-	-	-	-	-
46	-	-	1	1	2	-	-	-	-	-	-
47a	-	-	--	--	--	-	-	-	-	-	-
48a	-	-	--	--	--	-	-	-	-	-	-
49	-	-	--	--	--	-	-	-	-	-	-
50	-	-	1	1	2	-	-	-	-	-	-
51	-	-	2	2	4	-	-	-	1 05	1 04	2 04
52	-	-	--	2	2	-	-	-	-	2 08	2 04
53a	-	-	1	5	6	-	-	-	1 05	2 08	3 05
54a	-	2	10	6	18	-	-	2 29	5 24	4 15	11 19
55	-	1	2	3	5	-	-	-	1 05	2 08	3 05
56	-	-	2	3	5	-	-	-	-	1 04	1 04
58a	-	-	--	2	2	-	-	-	-	-	-
59a	1	3	8	7	19	-	-	2 29	6 29	5 19	13 23
60	-	-	1	--	1	-	-	-	-	-	-
60a	-	-	4	1	5	-	-	-	1 05	1 04	2 04
62a	-	1	--	--	1	-	-	-	-	1 04	1 02
63	-	-	--	--	--	-	-	-	-	-	-
64	-	-	--	1	1	-	-	-	-	-	-
65	-	-	--	1	1	-	-	-	-	-	-
66a	-	-	--	--	--	-	-	-	-	-	-
67	-	2	5	9	16	-	-	2 29	1 05	3 12	6 11
68a	-	-	1	2	3	-	-	-	-	-	-
69a	-	1	2	2	5	-	-	-	1 05	-	1 02
70	-	-	--	1	1	-	-	-	-	-	-
70b	-	-	--	1	1	-	-	-	-	-	-
71	-	-	--	1	1	-	-	-	-	-	-
72	1	2	3	2	8	1 33	1 14	1 05	1 04	4 07	
73	2	7	20	12	41	2 67	7 100	18 86	10 38	37 65	

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TABLE 167

## SONARMEN

## Sort A

Frequency of SOs (by rate) selecting items that describe their job

Item No.	C (3)	1 (7)	2 (21)	3 (26)	Tot. (57)	C (3)	1 (7)	2 (21)	3 (26)	Tot. (57)		
	f	%	f	%	f	%	f	%	f	%		
38a	3	3	6	1	13	-	--	1	14	2 10	1 04	4 07
39	-	-	3	1	4	-	--	-	--	-	-	--
41	-	-	--	--	--	-	--	-	--	-	--	
42	-	1	--	--	1	-	--	-	--	-	--	
43	-	-	--	--	--	-	--	-	--	-	--	
44	-	-	--	--	--	-	--	-	--	-	--	
45	-	-	--	--	--	-	--	-	--	-	--	
46	-	-	1	1	2	-	--	-	--	-	--	
47a	-	-	--	--	--	-	--	-	--	-	--	
48a	-	-	--	--	--	-	--	-	--	-	--	
49	-	-	--	--	--	-	--	-	--	-	--	
50	-	-	1	1	2	-	--	-	--	-	--	
51	-	-	2	2	4	-	--	-	1 05	1 04	2 04	
52	-	-	--	2	2	-	--	-	--	2 08	2 04	
53a	-	-	1	5	6	-	--	-	1 05	2 08	3 05	
54a	-	2	16	0	18	-	--	2 29	5 24	4 15	11 19	
55	-	1	2	3	5	-	--	-	1 05	2 08	3 05	
56	-	-	2	3	5	-	--	-	--	1 04	1 02	
58a	-	-	--	2	2	-	--	-	--	-	--	
59a	1	3	8	7	19	-	--	2 29	6 29	5 19	13 23	
60	-	-	1	--	1	-	--	-	--	-	--	
60a	-	-	4	1	5	-	--	-	1 05	1 04	2 04	
62a	-	1	--	--	1	-	--	-	--	1 04	1 02	
63	-	-	--	--	--	-	--	-	--	-	--	
64	-	-	--	1	1	-	--	-	--	-	--	
65	-	-	--	1	1	-	--	-	--	-	--	
66a	-	-	--	--	--	-	--	-	--	-	--	
67	-	2	5	9	16	-	--	2 29	1 05	3 12	6 11	
68a	-	-	1	2	3	-	--	-	--	-	--	
69a	-	1	2	2	5	-	--	-	1 05	-	1 02	
70	-	-	--	1	1	-	--	-	--	-	--	
70b	-	-	--	1	1	-	--	-	--	-	--	
71	-	-	--	1	1	-	--	-	--	-	--	
72	1	2	3	2	8	1	33	1	14	1 05	1 04	4 07
73	2	7	20	12	41	2	57	7	100	18 86	10 38	37 65

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SECURITY INFORMATION

TABLE 167

SONARMEN

Sort A

Frequency of SOs (by rate) selecting items that describe their job

Item No.	C (3)	1 (7)	2 (21)	3 (26)	Tot. (57)	C (3) f	1 (7) f	2 (21) f	3 (26) f	Tot. (57) f					
38a	3	3	6	1	13	-	1	14	2	10	1	04	4	07	
39	-	-	3	1	4	-	-	-	-	-	-	-	-	-	
41	-	-	--	--	--	-	-	-	-	-	-	-	-		
42	-	1	--	--	1	-	-	-	-	-	-	-	-		
43	-	-	--	--	--	-	-	-	-	-	-	-	-		
44	-	-	--	--	--	-	-	-	-	-	-	-	-		
45	-	-	--	--	--	-	-	-	-	-	-	-	-		
46	-	-	1	1	2	-	-	-	-	-	-	-	-		
47a	-	-	--	--	--	-	-	-	-	-	-	-	-		
48a	-	-	--	--	--	-	-	-	-	-	-	-	-		
49	-	-	--	--	--	-	-	-	-	-	-	-	-		
50	-	-	1	1	2	-	-	-	-	-	-	-	-		
51	-	-	2	2	4	-	-	-	1	05	1	04	2	04	
52	-	-	--	2	2	-	-	-	-	-	2	08	2	04	
53a	-	-	1	5	6	-	-	-	1	05	2	08	3	05	
54a	-	2	10	0	18	-	2	29	5	24	4	15	11	19	
55	-	1	2	3	5	-	-	-	1	05	2	08	3	05	
56	-	-	2	3	5	-	-	-	-	-	1	04	1	02	
58a	-	-	--	2	2	-	-	-	-	-	-	-	-	-	
59a	1	3	8	7	19	-	2	29	6	29	5	19	13	23	
60	-	-	1	--	1	-	-	-	-	-	-	-	-	-	
60a	-	-	4	1	5	-	-	-	1	05	1	04	2	04	
62a	-	1	--	--	1	-	-	-	-	-	1	04	1	02	
63	-	-	--	--	--	-	-	-	-	-	-	-	-	-	
64	-	-	--	1	1	-	-	-	-	-	-	-	-	-	
65	-	-	--	1	1	-	-	-	-	-	-	-	-	-	
66a	-	-	--	--	--	-	-	-	-	-	-	-	-	-	
67	-	2	5	9	16	-	2	29	1	05	3	12	6	11	
68a	-	-	1	2	3	-	-	-	-	-	-	-	-	-	
69a	-	1	2	2	5	-	-	-	1	05	-	-	1	02	
70	-	-	--	1	1	-	-	-	-	-	-	-	-	-	
70b	-	-	--	1	1	-	-	-	-	-	-	-	-	-	
71	-	-	--	1	1	-	-	-	-	-	-	-	-	-	
72	1	2	3	2	8	1	33	1	14	1	05	1	04	4	07
73	2	7	20	12	41	2	57	7	100	18	86	10	38	37	65

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**SECURITY INFORMATION**

TABLE 168

SONARMEN

Sort C

Percentage of SOs placing items  
that describe their jobs into 4  
categories of "Where Learned."

Item No.	All Rates Combined (57)	Shore School	Formal Shipbd.	Infor. Shipbd.	Self-Instr.	Very Seld.	Seldom	Occas.	Often	All Rates Combined (57)	Very Often
----------	-------------------------	--------------	----------------	----------------	-------------	------------	--------	--------	-------	-------------------------	------------

38a	--	--	--	--	7	2	5	--	--	--	--
39	--	--	--	--	--	--	--	--	--	--	--
41	--	--	--	--	--	--	--	--	--	--	--
42	--	--	--	--	--	--	--	--	--	--	--
43	--	--	--	--	--	--	--	--	--	--	--
44	--	--	--	--	--	--	--	--	--	--	--
45	--	--	--	--	--	--	--	--	--	--	--
46	--	--	--	--	--	--	--	--	--	--	--
47a	--	--	--	--	--	--	--	--	--	--	--
48a	--	--	--	--	--	--	--	--	--	--	--
49	--	--	--	--	--	--	--	--	--	--	--
50	--	--	--	--	--	--	--	--	--	--	--
51	4	--	--	--	--	2	--	--	2	--	--
52	2	--	--	--	--	2	--	--	2	--	--
53a	2	--	--	2	2	4	--	--	2	--	--
54a	16	--	--	--	4	2	4	5	5	4	4
55	5	--	--	--	--	--	5	--	--	--	--
56	2	--	--	--	--	2	--	--	--	--	--
58a	--	--	--	--	--	--	--	--	--	--	--
59a	12	--	--	9	2	--	4	9	7	4	4
60	--	--	--	--	--	--	--	--	--	--	--
60a	4	--	--	--	--	--	--	2	--	--	2
62a	--	--	--	--	2	--	--	--	--	--	2
63	--	--	--	--	--	--	--	--	--	--	--
64	--	--	--	--	--	--	--	--	--	--	--
65	--	--	--	--	--	--	--	--	--	--	--
66a	--	--	--	--	--	--	--	--	--	--	--
67	5	--	--	4	2	2	--	--	9	--	--
68a	--	--	--	--	--	--	--	--	--	--	--
69a	2	--	--	--	--	--	--	2	--	--	--
70	--	--	--	--	--	--	--	--	--	--	--
70b	--	--	--	--	--	--	--	--	--	--	--
71	--	--	--	--	--	--	--	--	4	--	--
72	--	2	--	2	4	2	2	2	4	--	--
73	19	25	--	7	14	--	4	21	28	12	

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SECURITY INFORMATION

TABLE 169

RADARMEN

Sort A-Frequency of RDs selecting items that describe their job.

Sort B-Frequency and Percentage of RDs selecting items that "best" describe job.

Sort C-Percentage of RDs placing items that describe jobs into four categories

of "Where Learned"(1)ShoreSchool(2)FormalShipbd.(3)Infor.Shipbd.(5)Self-Instr.

Sort D-Percentage of RDs placing items that describe their jobs into five categories of "How Often Done." (1)VerySeld.(2)Seldom(3)Occas.(4)Often(5)VeryOften.

Item No.	Sort A		Sort B		Sort C				Sort D						
	All Rates Comb.(21)	All Rates Comb.(21)	All Rates	Comb.(21)	1	2	3	4	All Rates	Comb.(21)	1	2	3	4	5
38a	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---
39	--	---	---	---	---	---	---	---	---	---	---	---	---	---	---
41	--	---	---	---	---	---	---	---	---	---	---	---	---	---	---
42	--	---	---	---	---	---	---	---	---	---	---	---	---	---	---
43	--	---	---	---	---	---	---	---	---	---	---	---	---	---	---
44	--	---	---	---	---	---	---	---	---	---	---	---	---	---	---
45	2	2 10	--	--	5	5	--	--	5	--	5	--	5	--	5
46	5	4 19	5	--	14	--	--	--	5	5	5	5	5	--	--
47a	5	2 10	--	5	5	--	--	--	--	10	--	--	--	--	--
48a	--	---	---	---	---	---	---	---	---	---	---	---	---	---	---
49	--	---	---	---	---	---	---	---	---	---	---	---	---	---	---
50	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---
51	--	---	---	---	---	---	---	---	---	---	---	---	---	---	---
52	--	---	---	---	---	---	---	---	---	---	---	---	---	---	---
53a	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---
54a	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
55	--	---	---	---	---	---	---	---	---	---	---	---	---	---	---
56	--	---	---	---	---	---	---	---	---	---	---	---	---	---	---
58a	3	2 10	--	5	5	--	--	--	--	10	--	--	--	--	--
59a	3	1 05	5	--	--	--	--	--	--	--	5	--	--	--	--
60	--	---	---	---	---	---	---	---	---	---	---	---	---	---	---
60a	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---
62a	--	---	---	---	---	---	---	---	---	---	---	---	---	---	---
63	2	1 05	5	--	---	---	---	---	---	---	5	--	--	--	--
64	--	---	---	---	---	---	---	---	---	---	---	---	---	---	---
65	--	---	---	---	---	---	---	---	---	---	---	---	---	---	---
66a	--	---	---	---	---	---	---	---	---	---	---	---	---	---	---
67	2	1 05	5	--	---	---	---	---	---	5	--	--	--	--	--
68a	--	---	---	---	---	---	---	---	---	---	---	---	---	---	---
69a	--	---	---	---	---	---	---	---	---	---	---	---	---	---	---
70	7	5 24	24	--	--	--	--	--	5	10	10	--	--	--	--
70b	--	---	---	---	---	---	---	---	---	---	---	---	---	---	---
71	--	1 05	5	--	---	---	---	---	5	--	--	---	---	---	---
72	--	---	---	---	---	---	---	---	---	---	---	---	---	---	---
73	18	18 86	38	33	14	--	5	10	24	38	10	--	--	--	--

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TABLE 170

RADIOMEN

Sort A-Frequency of RMs selecting items that describe their job.

Sort B-Frequency & Percentage of RMs selecting items that "best" describe job.

Sort C-Percentage of RMs placing items that describe jobs into 4 categories

of "Where Learned"(1)ShoreSchool(2)FormalShipbd.(3)Infor.Shipbd.(5)Self-Inst.

Sort D-Percentage of RMs placing items that describe their jobs into 5 categories of "How Often Done."(1)VerySeld.(2)Seldom(3)Occas.(4)Often(5)VeryOften

Item No.	Sort A All Rates Comb.(20)	Sort B All Rates Comb.(20)	Sort C				Sort D							
			All Rates	Comb.(20)	1	2	3	4	Comb.(20)	1	2	3	4	
38a	3	1 05	--	--	--	--	5	--	5	--	--	--	--	
39	1	-- --	--	--	--	--	--	--	--	--	--	--	--	
41	--	-- --	--	--	--	--	--	--	--	--	--	--	--	
42	2	1 05	--	--	--	--	5	--	5	--	--	--	--	
43	--	-- --	--	--	--	--	--	--	--	--	--	--	--	
44	--	-- --	--	--	--	--	--	--	--	--	--	--	--	
45	2	-- --	--	--	--	--	--	--	--	--	--	--	--	
46	--	-- --	--	--	--	--	--	--	--	--	--	--	--	
47a	--	-- --	--	--	--	--	--	--	--	--	--	--	--	
48a	--	-- --	--	--	--	--	--	--	--	--	--	--	--	
49	--	-- --	--	--	--	--	--	--	--	--	--	--	--	
50	--	-- --	--	--	--	--	--	--	--	--	--	--	--	
51	--	-- --	--	--	--	--	--	--	--	--	--	--	--	
52	--	-- --	--	--	--	--	--	--	--	--	--	--	--	
53a	1	1 05	--	--	5	--	5	--	--	--	--	--	--	
54a	--	-- --	--	--	--	--	--	--	--	--	--	--	--	
55	--	-- --	--	--	--	--	--	--	--	--	--	--	--	
56	--	-- --	--	--	--	--	--	--	--	--	--	--	--	
58a	2	2 10	--	--	5	5	--	5	5	--	--	--	--	
59a	2	-- --	--	--	--	--	--	--	--	--	--	--	--	
60	--	-- --	--	--	--	--	--	--	--	--	--	--	--	
60a	--	-- --	--	--	--	--	--	--	--	--	--	--	--	
62a	12	10 50	5	15	5	25	--	--	10	25	15	--	--	
63	10	9 45	--	10	10	25	--	5	5	20	15	--	--	
64	--	-- --	--	--	--	--	--	--	--	--	--	--	--	
65	6	4 20	--	--	20	--	5	--	--	10	5	--	--	
66a	4	2 10	--	--	10	--	5	--	--	5	--	--	--	
67	1	-- --	--	--	--	--	--	--	--	--	--	--	--	
68a	--	-- --	--	--	--	--	--	--	--	--	--	--	--	
69a	--	-- --	--	--	--	--	--	--	--	--	--	--	--	
70	--	-- --	--	--	--	--	--	--	--	--	--	--	--	
70b	--	-- --	--	--	--	--	--	--	--	--	--	--	--	
71	--	-- --	--	--	--	--	--	--	--	--	--	--	--	
72	--	-- --	--	--	--	--	--	--	--	--	--	--	--	
73	17	17 85	5	45	15	20	5	--	20	35	25	--	--	--

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CARD SORT ITEMS

- 74 \*Instruct ETs in maintenance fine points.  
75 Measure percentage modulation using an oscilloscope.  
76 Tune transmitter under radio silence, using dummy antennas.  
77 \*Repair terminal posts, plugs, and connections.  
78a\*Determine location of local radio interference using field intensity meters.
- 79 Repair phone cable.  
81 \*Requisition spare parts.  
82 Replace TR tube.  
83 Replace ATR tube.  
84 \*Replace T/R box.
- 85b Reinstall parts due to new specifications, i.e., making a field change.  
86 \*Tune local oscillator frequency by adjusting repeller voltage.  
87 \*Tune IF stages.  
88 Adjust magnitude of STC.  
89 Compute phase angle.
- 90 Tune TDZ manually.  
91 \*Install radar repeaters.  
92 \*Install radar indicators.  
93 Install radar main frame.  
94 Remove terminating resistor from PPI adapter.
- 95 Install radar antennas.  
96 Clean air filters.  
97 Measure relative power with echo box.  
98a Estimate and check to see whether the frequency is within desired limits.  
99 Repair chipped point on electronics gear, such as panels, doors, etc.
- 100a\*Inspect for moisture leaks in electronics gear.  
101 \*Align helipot tracking.  
102 Lubricate shaft couplings.  
103 \*Balance phasing bridge circuit.  
104 \*Replace helipot assembly.
- 105 Align synchro systems.  
106 \*Compute Q.  
107a\*Repair cooling system pumps and lines in electronic gear.  
109a\*Measure Q of individual circuit.  
111 Repair leaks on transmission line.

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TABLE 171

ELECTRONICS TECHNICIANS

Sort A

Frequency of ETs (by rate) selecting items that describe their job

Item No.	C (3)	1 (6)	2 (7)	3 (28)	SN (22)	Tot. (66)
----------	----------	----------	----------	-----------	------------	--------------

74	3	6	5	9	1	24
75	1	3	2	9	5	20
76	3	6	2	16	10	37
77	2	6	5	24	21	58
78a	1	6	-	--	--	1

79	3	6	3	24	17	53
81	3	6	4	22	20	55
82	3	6	3	18	18	48
83	3	6	3	14	13	39
84	2	2	2	5	6	17

85b	2	5	2	13	10	32
86	2	6	3	18	15	44
87	3	5	3	19	18	48
88	2	5	2	8	8	25
89	1	1	-	2	2	6

90	3	5	6	24	22	60
91	1	-	-	2	--	3
92	1	-	-	1	1	3
93	-	-	-	--	--	--
94	1	1	1	3	2	8

95	-	1	-	2	1	4
96	2	6	3	17	15	43
97	3	6	4	21	14	48
98a	2	4	3	20	13	42
99	-	3	1	9	11	24

100a	3	5	2	18	11	39
101	2	5	3	6	8	24
102	2	5	4	15	10	36
103	2	4	1	5	3	15
104	2	5	3	6	8	24

105	3	6	3	14	7	33
106	1	1	-	6	1	9
107a	1	2	2	6	--	11
109a	1	-	-	1	2	4
111	1	2	1	9	3	16

Sort B

Frequency and Percentage of ETs (by rate) selecting items that "best" describe job.

	C (3)	1 (6)	2 (7)	3 (28)	SN (22)	Tot. (66)
--	----------	----------	----------	-----------	------------	--------------

74	3	100	6	100	5	71
75	1	33	3	50	1	14
76	2	67	5	83	3	43
77	2	67	6	100	6	86
78a	-	-	-	-	-	-

79	2	67	6	100	2	29
81	3	100	5	83	4	57
82	3	100	6	100	4	57
83	3	100	6	100	3	43
84	2	67	2	33	1	14

85b	2	67	5	83	2	29
86	2	67	6	100	3	43
87	2	67	4	67	3	43
88	2	67	4	67	2	29
89	-	-	-	-	-	-

90	3	100	5	83	7	100
91	-	-	-	-	-	-
92	1	33	-	-	-	-
93	-	-	-	-	-	-
94	1	33	-	-	2	07

95	-	-	-	-	-	-
96	2	67	6	100	2	29
97	3	100	6	100	2	29
98a	2	67	4	67	3	43
99	-	2	33	--	7	25

100a	3	100	5	83	2	29
101	2	67	4	67	3	43
102	2	67	3	50	1	14
103	1	33	3	50	1	14
104	2	67	5	83	3	43

105	2	67	6	100	1	14
106	-	-	-	-	2	07
107a	-	-	-	-	3	11
109a	-	-	-	-	1	04
111	1	33	2	33	--	7

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TABLE 172

ELECTRONIC TECHNICIANS

Sort C

Sort D

Percentage of ETs placing items  
that describe their jobs into 4  
categories of "Where Learned."

Percentage of ETs placing items that  
describe their jobs into 5 categories  
of "How Often Done."

Item All Rates Combined (66)

No. Shore Formal Infor. Self-  
School Shipbd. Shipbd. Instr. Very  
Seld.

All Rates Combined (66)

Seldom Occas. Often Very  
Often Often

74	2	--	15	18	--	--	12	18	4
75	11	--	3	3	4	4	6	2	--
76	20	3	15	4	2	14	11	9	8
77	33	--	23	32	2	6	35	36	9
78a	--	--	--	--	--	--	--	--	--
79	11	--	18	36	2	6	24	23	11
81	--	6	50	20	--	4	12	27	32
82	15	3	32	20	3	27	27	11	2
83	11	3	23	14	3	17	21	8	2
84	3	--	11	4	6	8	3	2	--
85b	--	2	14	15	11	6	14	--	--
86	26	3	15	6	--	6	17	20	8
87	39	3	8	4	8	9	27	11	--
88	6	--	11	8	--	6	12	4	2
89	--	--	2	2	2	2	--	--	--
90	71	4	9	6	3	3	21	39	24
91	--	--	--	--	--	--	--	--	--
92	--	--	2	2	2	--	--	2	--
93	--	--	--	--	--	--	--	--	--
94	--	--	4	3	4	3	--	--	--
95	--	--	--	--	--	--	--	--	--
96	8	2	20	21	2	9	17	23	--
97	29	8	11	6	2	8	17	23	11
98a	21	3	18	6	2	3	15	15	14
99	2	--	6	12	2	8	3	6	2
100a	2	2	24	21	3	12	20	14	--
101	3	2	12	12	4	8	12	3	2
102	3	--	12	20	3	8	14	8	2
103	8	--	3	3	--	8	4	2	1
104	2	--	12	17	6	12	11	2	--
105	4	3	11	11	9	9	8	2	2
106	2	2	--	2	2	--	3	1	--
107a	--	--	3	2	--	3	2	--	--
109a	3	--	2	--	2	--	--	--	--
111	--	--	11	6	6	8	--	--	2

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TABLE 173

ELECTRONICS TECHNICIANS

Percentage of ETs (combined rates) placing items of Alpha and Beta subdecks in categories of Amount of Comprehension and Amount of Skill Required, using the categories of: (1)Very little(2)Some(3)Moderate(4)Much(5)Very much

Item No.	Comprehension(for each subdeck 31)					Skill(for each subdeck 31)				
	1	2	3	4	5	1	2	3	4	5
74 *	--	6	3	35	55	--	6	29	32	32
75	--	6	10	68	16	--	19	35	35	10
76	--	26	42	32	--	--	19	55	23	3
77 *	23	42	32	--	3	13	68	19	--	--
78a*	3	3	30	40	23	3	7	53	23	13
79	26	65	10	--	--	10	61	26	3	--
81 *	52	32	16	--	--	29	55	10	6	--
82	16	23	45	16	--	6	29	52	10	3
83	16	19	48	16	--	6	26	55	10	3
84 *	3	13	42	35	6	--	13	55	26	6
85b	--	10	45	26	19	--	6	35	48	10
86 *	3	13	29	45	10	3	19	42	26	10
87 *	--	3	52	35	10	--	13	45	29	13
88	3	6	52	35	3	3	29	55	13	--
89	--	3	10	52	35	6	6	39	32	16
90	3	26	29	42	--	3	26	42	29	--
91 *	--	10	32	35	23	1	6	26	62	6
92 *	6	16	35	30	13	6	6	23	55	10
93	23	23	19	26	10	3	26	23	26	23
94	10	23	32	35	--	3	29	48	16	3
95	3	19	13	23	42	--	10	35	29	26
96	90	6	--	3	--	77	19	3	--	--
97	3	19	42	29	6	3	29	55	13	--
98a	3	16	35	45	--	3	16	58	23	--
99	84	6	6	3	--	84	13	3	--	--
100a*	23	48	23	6	--	32	39	19	6	3
101 *	--	3	16	58	23	--	3	29	48	19
102	74	19	6	--	--	48	32	16	--	3
103 *	--	6	19	55	19	--	6	39	35	19
104 *	6	10	35	42	6	--	6	39	45	10
105	3	6	26	39	26	--	32	42	42	6
106 *	3	10	45	35	6	3	23	42	26	6
107 *	32	39	16	10	6	6	19	62	10	3
109a*	--	--	40	47	13	1	10	47	30	13
111	23	16	32	26	3	3	26	45	19	6

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SECURITY INFORMATION

TABLE 174

SONARMEN

Sort A

Frequency of SOs (by rate) selecting items that describe their job

Sort B

Frequency and Percentage of SOs (by rate) selecting items that "best" describe job

Item No.	0 (3)	1 (7)	2 (21)	3 (26)	Tot. (57)	0 (3) f	1 (7) f	2 (21) f	3 (26) f	Tot. (57) f
74	-	-	1	1	2	- - -	- - -	1 05	- - -	.1 02
75	-	-	1	1	2	- - -	- - -	- - -	- - -	- - -
76	-	1	--	--	1	- - -	- - -	- - -	- - -	- - -
77	1	7	15	9	32	1 33	6 86	11 52	6 23	24 42
78a	-	-	--	--	--	- - -	- - -	- - -	- - -	- - -
79	1	3	6	5	15	- - -	1 14	2 10	- - -	3 05
81	2	4	13	13	32	1 33	4 57	7 33	3 12	15 26
82	-	-	3	--	3	- - -	- - -	2 10	- - -	2 04
83	-	-	--	--	--	- - -	- - -	- - -	- - -	- - -
84	-	-	--	--	--	- - -	- - -	- - -	- - -	- - -
85b	1	6	12	5	24	1 33	5 71	7 33	4 15	17 30
86	-	-	2	--	2	- - -	- - -	2 10	- - -	2 04
87	1	4	7	8	20	- - -	4 57	4 19	3 12	11 19
88	-	-	--	--	--	- - -	- - -	- - -	- - -	- - -
89	-	-	--	--	--	- - -	- - -	- - -	- - -	- - -
90	-	-	--	--	--	- - -	- - -	- - -	- - -	- - -
91	-	-	--	--	--	- - -	- - -	- - -	- - -	- - -
92	-	-	--	--	--	- - -	- - -	- - -	- - -	- - -
93	-	-	--	--	--	- - -	- - -	- - -	- - -	- - -
94	-	-	--	--	--	- - -	- - -	- - -	- - -	- - -
95	-	-	--	--	--	- - -	- - -	- - -	- - -	- - -
96	-	4	17	7	28	- - -	3 43	14 67	6 23	23 40
97	-	-	1	--	1	- - -	- - -	- - -	- - -	- - -
98a	1	4	10	9	24	1 33	3 43	7 33	6 23	17 30
99	1	4	15	12	32	1 33	3 43	11 52	10 38	25 44
100a	2	5	10	10	27	2 67	4 57	10 48	10 38	26 46
101	-	-	--	1	1	- - -	- - -	- - -	- - -	- - -
102	2	4	12	6	24	1 67	3 43	10 48	5 19	19 33
103	-	-	--	--	--	- - -	- - -	- - -	- - -	- - -
104	-	-	--	--	--	- - -	- - -	- - -	- - -	- - -
105	1	6	10	5	22	- - -	5 71	2 10	3 12	10 18
106	-	-	--	--	--	- - -	- - -	- - -	- - -	- - -
107a	-	-	--	1	1	- - -	- - -	- - -	- - -	- - -
109a	-	-	--	--	--	- - -	- - -	- - -	- - -	- - -
111	-	-	--	1	1	- - -	- - -	- - -	1 04	1 02

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TABLE 174

SONARMEN

Sort C

Percentage of SOs placing items  
that describe their jobs into 4  
categories of "Where Learned."

Item All Rates Combined (57)  
No. Shore Formal Infor. Self-  
School Shipbd. Shipbd. Instr.

	All Rates Combined (57)	Very Seld.	Seldom	Occas.	Often	Very Often	
74	--	2	--	--	--	--	2
75	--	--	--	--	--	--	--
76	--	--	--	--	--	--	--
77	25	2	7	9	11	11	18
78a	--	--	--	--	--	--	--
79	--	--	--	5	--	2	2
81	5	4	14	4	2	7	7
82	4	--	--	--	2	--	2
83	--	--	--	--	--	--	--
84	--	--	--	--	--	--	--
85b	5	--	18	7	9	7	4
86	2	--	--	2	2	2	--
87	16	2	--	2	4	7	--
88	--	--	--	--	--	--	--
89	--	--	--	--	--	--	--
90	--	--	--	--	--	--	--
91	--	--	--	--	--	--	--
92	--	--	--	--	--	--	--
93	--	--	--	--	--	--	--
94	--	--	--	--	--	--	--
95	2	--	--	--	--	--	--
96	5	5	14	16	4	2	11
97	--	--	--	--	--	--	5
98a	9	2	9	11	2	7	7
99	5	4	19	16	7	11	11
100a	19	4	18	5	7	5	14
101	--	--	--	--	--	--	--
102	14	4	12	4	2	5	11
103	--	--	--	--	--	--	--
104	--	--	--	--	--	--	--
105	9	--	9	--	5	7	4
106	--	--	--	--	--	--	--
107a	--	--	--	--	--	--	--
109a	--	--	--	--	--	--	--
111	--	--	2	--	2	--	--

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TABLE 176

RADARMEN

Sort A-Frequency of RDs selecting items that describe their job.  
Sort B-Frequency & Percentage of RDs selecting items that "best" describe job.  
Sort C-Percentage of RDs placing items that describe jobs into 4 categories  
of "Where Learned"(1)ShoreSchool(2)FormalShipbd.(3)Infor.Shipbd.(4)Self-Inst.  
Sort D-Percentage of RDs placing items that describe their jobs into 5 cate-  
gories of "How Often Done."(1)VerySeld.(2)Seldom(3)Occas.(4)Often(5)VeryOften

Item No.	Sort A		Sort B		Sort C				Sort D							
	All Rates	Comb.(21)	All Rates	Comb.(21)	All Rates	1	2	3	4	All Rates	Comb.(21)	1	2	3	4	5
74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
76	2	1 05	--	--	--	5	--	--	--	5	--	--	--	--	--	--
77	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
78a	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
79	1	1 05	--	--	--	--	5	--	--	5	--	--	--	--	--	--
81	3	.3 14	--	--	10	5	--	--	5	5	5	--	--	--	--	--
82	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
83	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
85b	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
86	2	1 05	--	--	5	--	--	--	--	--	5	--	--	--	--	--
87	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
88	3	1 05	--	--	5	--	--	--	--	5	--	--	--	--	--	--
89	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
90	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
91	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
92	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
94	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
95	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
96	12	10 48	5	10	24	10	--	--	24	14	10	--	--	--	--	--
97	2	2 10	5	--	5	--	--	--	--	5	5	--	--	--	--	--
98a	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
99	7	4 19	5	--	10	5	--	5	5	5	5	5	--	--	--	--
100a	4	4 19	5	--	14	--	--	--	5	5	10	--	--	--	--	--
101	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
102	7	3 14	--	--	14	--	--	--	5	10	--	--	--	--	--	--
103	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
104	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
105	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
106	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
107a	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
109a	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
111	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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TABLE 177

RADIOMEN

Sort A-Frequency of RMs selecting items that describe their job.  
Sort B-Frequency & Percentage of RMs selecting items that "best" describe job.  
Sort C-Percentage of RMs placing items that describe jobs into 4 categories  
of "Where Learned"(1)ShoreSchool(2)FormalShipbd.(3)Inf.Shipbd.(4)Self-Instr.  
Sort D-Percentage of RMs placing items that describe their jobs into 5 cate-  
gories of "How Often Done."(1)VerySeld.(2)Seldom(3)Occas.(4)Often(5)VeryOften

Item No.	Sort A All Rates Comb.(20)	Sort B All Rates Comb.(20)	Sort C				Sort D								
			All Rates	Comb.(20)	1	2	3	4	All Rates	Comb.(20)	1	2	3	4	5
74	1	— —	—	—	—	—	—	—	—	—	—	—	—	—	—
75	—	— —	—	—	—	—	—	—	—	—	—	—	—	—	—
76	14	11 55	—	20	25	10	—	5	20	15	15	—	—	—	—
77	4	— —	—	—	—	—	—	—	—	—	—	—	—	—	—
78a	—	— —	—	—	—	—	—	—	—	—	—	—	—	—	—
79	1	1 05	—	—	—	—	5	—	5	—	—	—	—	—	—
81	3	1 05	—	—	—	—	5	—	—	—	—	5	—	—	—
82	—	— —	—	—	—	—	—	—	—	—	—	—	—	—	—
83	—	— —	—	—	—	—	—	—	—	—	—	—	—	—	—
84	—	— —	—	—	—	—	—	—	—	—	—	—	—	—	—
85b	—	— —	—	—	—	—	—	—	—	—	—	—	—	—	—
86	—	— —	—	—	—	—	—	—	—	—	—	—	—	—	—
87	6	4 20	—	5	—	15	—	—	—	10	5	5	—	—	—
88	—	— —	—	—	—	—	—	—	—	—	—	—	—	—	—
89	—	— —	—	—	—	—	—	—	—	—	—	—	—	—	—
90	5	5 25	5	10	5	5	—	—	5	5	15	—	—	—	—
91	—	— —	—	—	—	—	—	—	—	—	—	—	—	—	—
92	—	— —	—	—	—	—	—	—	—	—	—	—	—	—	—
93	—	— —	—	—	—	—	—	—	—	—	—	—	—	—	—
94	—	— —	—	—	—	—	—	—	—	—	—	—	—	—	—
95	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
96	3	2 10	—	5	—	5	—	—	5	5	—	—	—	—	—
97	—	— —	—	—	—	—	—	—	—	—	—	—	—	—	—
98a	17	17 85	—	40	25	20	—	—	5	—	20	60	—	—	—
99	7	4 20	—	5	—	15	—	5	10	5	—	—	—	—	—
100a	2	— —	—	—	—	—	—	—	—	—	—	—	—	—	—
101	—	— —	—	—	—	—	—	—	—	—	—	—	—	—	—
102	4	2 10	—	—	5	5	—	—	—	—	10	—	—	—	—
103	1	— —	—	—	—	—	—	—	—	—	—	—	—	—	—
104	—	— —	—	—	—	—	—	—	—	—	—	—	—	—	—
105	—	— —	—	—	—	—	—	—	—	—	—	—	—	—	—
106	—	— —	—	—	—	—	—	—	—	—	—	—	—	—	—
107a	—	— —	—	—	—	—	—	—	—	—	—	—	—	—	—
109a	—	— —	—	—	—	—	—	—	—	—	—	—	—	—	—
111	—	— —	—	—	—	—	—	—	—	—	—	—	—	—	—

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SECURITY INFORMATION

CARD SORT ITEMS

- 112 Plot antenna radiation pattern for RDF.
- 113 Adjust transmission line slugs.
- 114b\* Calibrate sonar range unit according to a given known range.
- 115 \*Align superheterodyne receiver.
- 116a Check for standing waves on antenna.
  
- 117a\*Determine power output of communications transmitter.
- 118 \*Measure output impedance.
- 120 Compute resistance-capacitance time constant.
- 121a\*Compute shunt resistance in order to calibrate meter.
- 122a Compute resonant frequencies in tank circuit.
  
- 123 \*Compute signal traverse times.
- 125 Compute amplification factor.
- 126 \*Compute standing wave ratio.
- 127 \*Measure synchro (selsyn) voltages.
- 128 \*Measure AVC voltage.
  
- 129 \*Measure lines of forces (magnetic and electrostatic).
- 130a Measure selectivity (band pass) of communications receiver.
- 131a Check standing waves with scope or voltmeter.
- 132 \*Measure input signal strength.
- 135a\*Measure signal to noise ratio by using scope.
  
- 136a\*Replace or repair antenna wire mesh.
- 137a Replace broken interlocks.
- 138 \*Replace wave guide (or any part thereof).
- 139a Make mechanical adjustment of worm gears in equipment such as VF or VG.
- 140 \*Lubricate gears.
  
- 141 Replace indicator lamps.
- 142 Replace lighthouse tubes.
- 143 \*Replace cathode ray tube.
- 144 \*Replace klystron.
- 145 \*Read schematic diagrams.
  
- 146 Observe waveforms with portable scope.
- 147 Use volt meter.
- 148 \*Trace signal by means of scope.
- 149 Mechanically adjust scope deflection coil.
- 150b\*Replace transmitter type-tubes as in SCR.

RESTRICTED

TABLE 178

ELECTRONICS TECHNICIANS

Sort A

Sort B

Frequency of ETs (by rate) selecting items that describe their job Frequency and Percentage of ETs (by rate) selecting items that "best" describe job

Item No.	C (3)	1 (6)			2 (7)			3 (28)			SN (22)	Tot. (66)	0 (3)			1 (6)			2 (7)			SN (22)	Tot. (66)
		f	%	f	%	f	%	f	%	f			f	%	f	%	f	%	f	%			
112	1	1	1	2	—	—	—	—	—	—	5	—	—	—	—	—	—	—	—	—	—	—	—
113	2	4	4	12	7	29	—	—	3	50	2	29	7	25	3	14	15	23	—	—	—	—	—
114b	—	1	—	2	—	3	—	—	1	17	—	—	1	04	—	—	—	—	—	—	2	03	—
115	3	5	3	17	19	47	3	100	4	67	3	43	13	46	10	45	33	50	—	—	—	—	—
116a	2	1	2	8	7	20	1	33	1	17	1	14	6	21	2	09	11	17	—	—	—	—	—
117a	2	5	4	20	18	49	—	—	5	83	2	29	21	75	14	64	42	64	—	—	—	—	—
118	1	1	—	6	6	14	—	—	1	17	—	—	5	19	3	14	9	14	—	—	—	—	—
120	3	3	1	10	5	22	1	33	3	50	—	—	3	11	1	04	8	12	—	—	—	—	—
121a	1	3	1	5	4	14	—	—	1	17	—	—	1	04	1	04	3	04	—	—	—	—	—
122a	1	3	1	10	6	21	1	33	3	50	—	—	3	11	3	14	10	15	—	—	—	—	—
123	—	1	1	2	2	6	—	—	1	17	1	14	—	—	1	04	3	04	—	—	—	—	—
125	1	3	2	6	4	16	1	33	1	17	1	14	2	07	1	04	6	09	—	—	—	—	—
126	2	2	2	7	1	14	1	33	2	33	2	29	5	18	—	—	10	15	—	—	—	—	—
127	2	5	3	15	6	31	1	33	4	67	—	—	9	32	4	18	18	27	—	—	—	—	—
128	2	4	2	13	14	35	2	67	3	50	2	29	8	28	9	41	24	36	—	—	—	—	—
129	—	—	—	1	1	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
130a	3	3	1	8	6	21	1	33	3	50	—	—	4	14	4	18	12	18	—	—	—	—	—
131a	2	2	2	6	1	13	1	33	2	33	2	29	3	11	—	—	8	12	—	—	—	—	—
132	2	3	1	11	11	28	2	67	3	50	—	—	7	25	6	27	18	27	—	—	—	—	—
135a	2	4	1	7	4	18	1	33	3	50	1	14	4	14	4	18	13	20	—	—	—	—	—
136a	2	1	2	2	2	9	—	—	—	—	—	—	2	07	2	09	4	06	—	—	—	—	—
137a	3	4	3	17	10	37	2	67	4	67	2	29	15	54	4	18	27	41	—	—	—	—	—
138	1	1	2	6	8	18	—	—	1	17	—	—	—	—	—	1	04	2	03	—	—	—	—
139a	1	4	3	10	6	24	1	33	2	33	—	—	4	14	2	09	9	14	—	—	—	—	—
140	3	6	4	16	17	46	2	67	6	100	2	29	16	57	11	50	37	56	—	—	—	—	—
141	2	6	6	24	16	54	2	67	6	100	6	86	24	86	16	73	54	82	—	—	—	—	—
142	3	6	6	24	17	56	3	100	6	100	6	86	24	86	17	77	56	85	—	—	—	—	—
143	3	6	4	22	16	51	3	100	6	100	5	71	18	64	14	64	46	70	—	—	—	—	—
144	3	5	3	15	11	37	3	100	5	83	3	43	14	50	5	23	30	45	—	—	—	—	—
145	3	6	7	28	22	66	3	100	6	100	7	100	28	100	21	95	65	98	—	—	—	—	—
146	3	6	5	21	18	53	3	100	6	100	6	86	18	64	14	64	47	71	—	—	—	—	—
147	3	6	6	27	22	64	3	100	6	100	6	86	27	96	20	91	62	94	—	—	—	—	—
148	3	5	2	20	16	46	3	100	5	83	2	29	17	61	12	54	39	59	—	—	—	—	—
149	2	5	4	14	9	34	1	33	5	83	4	57	8	28	4	18	22	33	—	—	—	—	—
150b	1	3	6	18	18	46	1	33	3	50	6	86	19	68	14	64	43	65	—	—	—	—	—

TABLE 179

ELECTRONICS TECHNICIANS

Sort C

Percentage of ETs placing items that describe their jobs into 4 categories of "Where Learned."

Item No.	All Rates Combined (66)			
	Shore School	Formal Shipbd.	Infor. Inst.	Self-Selhd.
112	—	—	—	—
113	9	—	—	—
114b	24	3	3	—
115	38	6	6	3
116a	6	—	9	—
117a	23	2	35	4
118	9	2	3	—
120	9	—	—	3
121a	4	—	—	—
122a	14	—	2	—
123	3	2	—	—
125	9	—	—	—
126	8	—	—	—
127	11	—	11	6
128	21	3	8	4
129	—	—	—	—
130a	14	—	4	—
131a	6	—	4	2
132	17	2	6	4
135a	4	—	11	4
136a	—	2	2	3
137a	6	2	12	21
138	—	—	2	2
139a	2	—	8	3
140	9	2	12	33
141	21	2	20	39
142	23	3	44	15
143	12	2	47	9
144	9	2	26	9
145	77	3	6	9
146	52	—	18	2
147	77	2	8	6
148	41	3	14	14
149	6	—	14	14
150b	24	—	23	18

Sort D

Percentage of ETs placing items that describe their jobs into 5 categories of "How Often Done."

Very Seld.	Seldom	Occas.	Often	Very Often
------------	--------	--------	-------	------------

112	—	—	—	—
113	9	—	—	—
114b	24	3	3	—
115	38	6	6	3
116a	6	—	9	—
117a	23	2	35	4
118	9	2	3	—
120	9	—	—	—
121a	4	—	—	—
122a	14	—	2	—
123	3	2	—	—
125	9	—	—	—
126	8	—	—	—
127	11	—	11	6
128	21	3	8	4
129	—	—	—	—
130a	14	—	4	—
131a	6	—	4	2
132	17	2	6	4
135a	4	—	11	4
136a	—	2	2	3
137a	6	2	12	21
138	—	—	2	2
139a	2	—	8	3
140	9	2	12	33
141	21	2	20	39
142	23	3	44	15
143	12	2	47	9
144	9	2	26	9
145	77	3	6	9
146	52	—	18	2
147	77	2	8	6
148	41	3	14	14
149	6	—	14	14
150b	24	—	23	18

RESTRICTED  
SECURITY INFORMATION

TABLE 160

## ELECTRONICS TECHNICIANS

Percentage of ETs (combined rates) placing items of Alpha and Beta subdecks in categories of Amount of Comprehension and Amount of Skill Required, using the categories of: (1) Very little (2) Some (3) Moderate (4) Much (5) Very much

Item No.	Comprehension(for each subdeck 31)					Skill(for each subdeck 31)				
	1	2	3	4	5	1	2	3	4	5
112	--	6	19	45	29	3	10	32	35	19
113	--	3	42	45	10	1	10	48	39	3
114b*	--	3	43	40	13	1	13	37	43	7
115 *	--	3	19	68	10	1	3	47	43	10
116a	--	10	32	52	6	1	13	55	23	10
117a*	1	19	47	32	3	6	32	29	32	--
118 *	1	3	32	55	10	1	26	39	26	10
120	3	13	26	39	19	3	26	32	35	3
121a*	--	3	47	43	10	3	19	39	35	--
122a	--	13	3	48	35	6	16	29	48	--
123 *	--	13	19	47	23	1	13	35	29	23
125	--	10	13	48	29	3	16	39	39	3
126 *	--	13	29	35	23	1	29	29	32	10
127 *	3	29	43	19	6	6	42	35	13	3
128 *	6	23	43	26	3	3	58	29	10	--
129 *	--	10	43	26	20	1	17	50	17	17
130a	--	--	19	58	23	1	6	45	35	13
131a	--	--	26	52	23	1	13	52	29	6
132 *	--	16	47	32	6	3	19	55	13	10
135a*	3	3	29	52	13	1	19	52	23	6
136a*	26	23	32	13	6	6	26	48	16	3
137a	45	45	10	--	1	16	65	16	3	6
138 *	19	32	29	13	6	6	39	29	19	10
139a	16	23	35	19	--	6	16	39	29	--
140 *	68	19	13	--	43	4	48	6	3	--
141	90	10	--	--	--	81	16	3	--	--
142	19	42	35	3	--	19	42	32	6	--
143 *	6	23	55	16	--	3	29	55	13	--
144 *	3	10	47	32	10	3	19	55	23	--
145 *	--	63	32	52	13	1	29	45	16	10
146	6	6	26	48	13	1	19	52	19	10
147	16	35	35	13	--	3	58	39	--	--
148 *	--	3	32	58	6	1	13	58	29	3
149	3	16	55	10	--	1	23	42	32	--
150b*	16	43	39	3	--	10	62	29	--	--

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SECURITY INFORMATION

TABLE 181

SONARMEN

Sort A

Frequency of SOs (by rate) selecting items that describe their job

Items C No.	(3)	1 (7)	2 (21)	3 (26)	Tot. (57)
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Items C No.	(3)	Sort A			Sort B			Tot. (57)
		f	%	f	%	f	%	
112	-	-	--	-	--	-	--	--
113	-	-	1	1	2	-	-	1 02
114b	1	4	12	11	28	1 67	4 57	8 38
115	1	3	7	6	17	1 67	3 43	4 19
116a	-	-	--	-	--	-	-	10 38
117a	-	1	3	1	5	-	1 14	2 10
118	-	1	2	3	6	-	1 14	1 05
120	-	-	1	3	4	-	-	2 08
121a	-	-	--	2	2	-	-	1 04
122a	-	1	1	3	5	-	-	2 04
123	-	1	--	--	1	-	-	--
125	-	-	1	2	3	-	-	--
126	-	-	--	1	1	-	-	--
127	1	6	10	6	23	-	5 71	7 33
128	2	1	5	5	13	-	1 14	3 14
129	-	-	--	1	1	-	-	4 15
130a	-	-	--	--	--	-	-	16 28
131a	-	-	3	1	4	-	-	6 23
132	1	2	6	6	15	-	2 29	4 19
135a	1	1	1	--	3	1 33	-	5 19
136a	-	-	--	-	--	-	-	--
137a	3	5	8	5	21	-	3 43	5 24
138	-	-	--	--	--	-	-	3 12
139a	-	1	2	1	4	-	1 14	2 10
140	3	7	17	14	41	1 33	5 71	16 77
141	3	8	16	18	45	2 67	6 86	15 71
142	-	1	--	--	1	-	-	14 54
143	2	2	6	3	13	2 67	2 29	5 24
144	-	-	--	--	--	-	-	2 08
145	3	7	20	18	48	2 67	7 100	15 71
146	1	2	3	5	11	-	1 14	2 10
147	3	5	17	15	40	2 67	5 71	15 71
148	-	3	4	2	9	-	1 14	3 14
149	1	3	14	8	26	1 33	2 29	7 33
150b	1	2	4	4	11	-	2 29	3 14
						-	-	6 23
						-	-	2 08
						-	-	7 12

~~RESTRICTED~~  
~~SECURITY INFORMATION~~

TABLE 182

SONARMEN

Sort C

Percentage of SOs placing items  
that describe their jobs into 4  
categories of "Where Learned."

Item All Rates Combined (57)  
No. Shore Formal Infor. Self-  
School Shipbd. Shipbd. Inst.

	All Rates Combined (57)	Very Seldi.	Seldom	Occas.	Often	Very Often	All Rates Combined (57)	Very Seldi.	Seldom	Occas.	Often	Very Often
112	—	—	—	—	—	—	—	—	—	—	—	—
113	—	—	—	—	—	—	—	—	—	—	—	—
114b	23	4	11	4	2	—	9	7	5	—	16	7
115	16	—	2	2	—	7	—	—	—	—	—	—
116a	—	—	—	—	—	—	—	—	—	—	—	—
117a	5	—	2	—	—	—	4	2	4	—	—	2
118	5	—	—	—	—	—	—	—	—	—	—	—
120	4	—	—	—	—	—	—	—	—	—	—	—
121a	—	—	—	—	—	—	—	—	—	—	—	—
122a	—	—	—	—	—	—	—	—	—	—	—	—
123	—	—	—	—	—	—	—	—	—	—	—	—
125	—	—	—	—	—	—	—	—	—	—	—	—
126	—	—	—	—	—	—	—	—	—	—	—	—
127	25	—	—	—	2	2	2	11	2	12	4	4
128	12	—	—	—	4	2	2	—	—	5	—	5
129	2	—	—	—	—	—	—	2	—	—	—	—
130a	—	—	—	—	—	—	—	—	—	—	—	—
131a	2	—	—	—	—	—	—	—	—	—	2	2
132	14	—	—	—	4	—	2	—	—	11	—	2
135a	2	—	—	—	—	—	—	—	—	—	—	2
136a	—	—	—	—	—	—	—	—	—	—	—	—
137a	11	2	7	—	—	—	14	2	—	—	—	—
138	—	—	—	—	—	—	—	—	—	—	—	—
139a	4	—	—	—	—	—	5	2	7	—	—	2
140	23	5	16	14	—	—	—	7	16	—	30	2
141	40	4	12	9	—	2	—	11	25	—	26	2
142	—	—	4	4	—	—	—	—	—	—	—	—
143	9	—	—	—	—	—	12	—	—	—	—	—
144	—	—	—	—	—	—	—	—	—	—	—	—
145	61	—	—	4	—	—	5	7	—	9	23	26
146	4	—	4	2	—	—	—	4	—	—	—	—
147	54	—	4	5	2	5	4	4	—	21	23	27
148	4	—	4	2	—	—	—	—	—	—	—	—
149	12	2	7	7	2	—	5	7	5	—	5	7
150b	5	—	5	2	—	—	—	2	—	—	—	—

~~RESTRICTED~~

RESTRICTED  
SECURITY INFORMATION

TABLE 183

## RADARMEN

Sort A-Frequency of RDs selecting items that describe their job.  
Sort B-Frequency & Percentage of RDs selecting items that "best" describe job.  
Sort C-Percentage of RDs placing items that describe jobs into 4 categories  
of "Where Learned"(1)ShoreSchool(2)FormalShipbds.(3)Inf.Shipbd.(4)Self-Inst.  
Sort D-Percentage of RDs placing items that describe their jobs into 5 cate-  
gories of "How Often Done."(1)VarySeld.(2)Seldom(3)Occas.(4)Often(5)VeryOften

Item No.	Sort A		Sort B		Sort C				Sort D									
	All Rates	Comb.(21)	All Rates	Comb.(21)	All	Rates	Comb.(21)	1	2	3	4	5	All Rates	Comb.(21)	1	2	3	4
112	1		1 05		5	—	—	—	—	5	—	—	—	—	—	—	—	—
113	—		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
114b	—		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
115	1		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
116a	—		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
117a	2		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
118	1		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
120	—		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
121a	—		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
122a	—		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
123	—		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
125	—		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
126	1		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
127	—		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
128	2		1 05		—	—	—	—	5	—	—	5	—	—	—	—	—	—
129	—		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
130a	2		1 05		—	5	—	—	—	—	—	—	—	—	5	—	—	—
131a	—		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
132	1		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
135a	4		2 10		—	—	5	5	5	—	—	—	—	—	5	5	—	—
136a	—		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
137a	2		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
138	—		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
139a	—		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
140	9		7 33		14	5	14	—	—	—	—	—	10	14	10	—	—	—
141	9		5 24		14	—	—	—	10	—	5	5	5	5	5	5	5	5
142	1		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
143	2		1 05		—	—	—	—	5	—	5	—	—	—	—	—	—	—
144	—		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
145	5		3 14		14	—	—	—	—	—	—	5	5	5	5	5	—	—
146	3		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
147	2		1 05		5	—	—	—	—	—	—	—	—	5	—	—	—	—
148	2		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
149	2		1 05		—	—	—	5	—	—	5	—	—	—	—	—	—	—
150b	—		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

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~~SECURITY INFORMATION~~

TABLE 184

## RADIOMEN

Sort A-Frequency of RMs selecting items that describe their job.  
Sort B-Frequency & Percentage of RMs selecting items that "best" describe job.  
Sort C-Percentage of RMs placing items that describe jobs into 4 categories  
of "Where Learned"(1)ShoreSchool(2)FormalShipbd.(3)Inf.Shipbd.(4)Self-Inst.  
Sort D-Percentage of RMs placing items that describe their jobs into 5 cate-  
gories of "How Often Done"(1)VerySeld.(2)Seldom(3)Occas.(4)Often(5)VeryOften

Item No.	Sort A All Rates Comb.(20)	Sort B All Rates Comb.(20)	Sort C				Sort D								
			All Rates	Comb.(20)	1	2	3	4	All Rates	Comb.(20)	1	2	3	4	5
112	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
113	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
114b	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
115	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
116a	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
117a	11	8 40	--	15	20	5	--	--	--	10	20	10	--	--	--
118	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
120	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
121a	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
122a	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
123	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
125	1	1 05	--	5	--	--	--	--	--	5	--	--	--	--	"
126	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
127	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
128	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
129	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
130a	2	1 05	--	5	--	--	--	--	--	--	--	5	--	--	--
131a	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
132	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
135a	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
136a	1	1 05	--	--	--	--	--	5	5	--	--	--	--	--	--
137a	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
138	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
139a	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
140	8	4 20	--	5	--	10	5	5	5	--	10	5	--	--	--
141	4	4 20	--	--	--	--	20	--	5	10	5	--	--	--	--
142	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
143	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
144	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
145	5	3 15	--	5	--	--	10	--	--	10	--	5	--	5	--
146	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
147	1	1 05	--	--	--	--	--	5	--	--	--	5	--	--	--
148	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
149	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
150b	2	1 05	--	--	--	--	--	5	--	5	--	--	--	--	--

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SECURITY INFORMATION

CARD SORT ITEMS

- 151a Check circuit continuity. Trace circuit continuity by means of schematic.  
152a\*Check for open coil.  
153a\*Trace signal by means of vacuum tube voltmeter.  
155 \*Measure transformer voltage.  
156 \*Measure oscillator output.
- 157a Replace fixed fuses.  
158a Replace fixed capacitors.  
159a\*Replace fixed resistor.  
160 Replace brushes in generators.  
161 Replace rectifier tubes.
- 162 \*Mechanically adjust scope focus coil.  
163 \*Fill out installation record.  
164 \*Calibrate radar range marks according to a given known range.  
166a Adjust PPI sweep length.  
167a Adjust cathode ray tube positioning adjustments.
- 168a Vary tank circuit inductance by screwdriver adjustment.  
169 \*Vary tank circuit capacitance with variable capacitor.  
170 Compute voltage requirements in a given circuit.  
171 Compute current requirements in a given circuit.  
172 Measure receiver performance with signal generator.
- 173 Inspect tube pins for burning or corrosion.  
174 \*Inspect fuse and resistor clips for pitting or burning.  
175a Test vacuum tube for intermittent shorts by rocking it in tube tester.  
176a Make electrical loudspeaker repairs.  
177a Repair microphone carbon element.
- 178 Determine value of component from color coding.  
179 Instruct radar operators in maintenance.  
180a\*Repair headphone and headset.  
182 Fill out failure report.  
183 \*Supervise corrective maintenance activities.
- 184 Supervise preventive maintenance schedule.  
185b\*Replace blower fans in electronic gear.  
186a Measure tube transconductance with tube tester.  
187 Review records for possible cause of failure.  
188 \*Draw schematic diagrams.

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TABLE 185

ELECTRONICS TECHNICIANS

Sort A

Sort B

Frequency of ETs (by rate) selecting items that describe their job      Frequency & Percentage of ETs (by rate) selecting items that "best" describe job

Item No.	C (3)	1 (6)	2 (7)	3 (28)	SN (22)	Tot. (66)	C (3)	1 (6)	2 (7)	3 (28)	SN (22)	Tot. (66)						
	f	%	f	%	f	%	f	%	f	%	f	%						
151a	3	6	7	28	22	66	3	100	6	100	7	100	28	100	21	95	65	98
152a	3	6	4	24	20	57	3	100	6	100	5	71	23	82	15	68	52	79
153a	1	3	2	13	7	26	1	33	2	33	2	29	8	28	4	18	17	26
155	3	5	5	22	21	56	3	100	5	83	6	86	22	78	16	73	52	79
156	2	5	1	12	10	30	2	67	5	83	1	14	9	32	5	23	22	33
157a	3	6	7	26	22	64	3	100	6	100	7	100	26	93	20	91	62	94
158a	3	6	5	26	21	61	3	100	6	100	5	71	26	93	17	77	57	86
159a	3	6	6	27	21	63	3	100	6	100	6	86	27	96	16	73	58	88
160	3	5	3	18	13	42	2	67	4	67	3	43	14	50	9	41	32	48
161	3	6	6	28	22	65	3	100	6	100	6	86	28	100	22	100	65	98
162	2	5	3	15	9	34	2	67	5	83	3	43	11	39	3	14	24	36
163	2	3	-	8	8	21	2	67	3	50	-	---	6	21	4	18	15	23
164	2	5	2	11	12	32	2	67	5	83	2	29	11	39	4	18	24	36
166a	3	6	3	22	21	55	3	100	6	100	3	43	20	71	11	50	43	65
167a	3	6	5	20	17	51	3	100	6	100	6	86	17	61	13	59	45	68
168a	3	5	3	22	17	50	3	100	4	67	3	43	19	68	12	54	41	62
169	2	6	3	22	18	51	2	67	6	100	4	57	20	71	15	68	47	71
170	2	5	4	15	12	38	1	33	4	67	4	57	8	28	8	36	25	38
171	1	3	2	12	10	28	-	---	2	33	1	14	6	21	4	18	13	20
172	3	4	3	16	17	43	2	67	4	67	3	43	15	54	10	45	34	52
173	2	6	5	20	16	49	1	33	6	100	4	57	16	57	12	54	39	59
174	3	5	6	22	18	54	2	67	5	83	5	71	19	68	10	45	41	62
175a	3	6	6	26	22	63	3	100	6	100	6	86	26	93	20	91	61	92
176a	2	5	3	22	22	54	2	67	3	50	2	29	19	68	16	73	42	64
177a	-	1	2	1	1	5	-	---	-	---	-	1	04	-	-	-	1	02
178	3	6	7	26	22	64	3	100	6	100	7	100	26	93	21	95	63	95
179	3	5	3	16	11	38	3	100	4	67	1	14	13	46	6	27	27	41
180a	3	6	5	27	21	62	3	100	6	100	3	43	27	96	17	77	56	85
182	3	6	6	25	21	61	3	100	6	100	6	86	25	89	18	82	58	88
183	3	6	6	11	7	33	3	100	6	100	6	86	10	36	2	09	27	41
184	3	5	5	13	9	35	3	100	5	83	5	71	13	46	3	14	29	44
185b	2	5	2	14	10	33	1	33	3	50	-	---	8	28	5	23	17	26
186a	3	6	6	26	20	61	3	100	6	100	7	100	26	93	17	77	59	89
187	3	6	4	20	17	50	3	100	6	100	4	57	19	68	11	50	43	65
188	3	5	2	18	15	43	2	67	4	67	1	14	12	43	8	36	27	41

TABLE 186

## ELECTRONICS TECHNICIANS

Sort C

Percentage of ETs placing items that describe their jobs into 4 categories of "Where Learned."

Item No.	All Rates Combined (66)	Shore School	Formal Shipbd.	Infor. Shipbd.	Self-School Inst.
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Item No.	All Rates Combined (66)	Very Seld.	Seldom	Occas.	Often	Very Often
151a	80	3	8	8	—	2
152a	64	--	9	6	6	8
153a	20	2	4	—	—	4
155	59	3	11	6	3	6
156	18	--	11	4	4	4
157a	52	--	15	27	--	4
158a	52	--	17	18	8	3
159a	54	--	15	18	4	4
160	18	--	12	18	6	14
161	62	2	17	18	2	8
162	3	--	12	21	3	8
163	2	2	14	6	2	11
164	6	2	15	11	3	6
166a	15	2	18	18	3	8
167a	29	--	30	15	6	12
168a	41	2	11	9	8	12
169	59	2	6	4	—	8
170	26	3	3	4	4	12
171	15	--	2	3	4	3
172	35	--	12	4	8	8
173	20	2	15	23	2	6
174	24	--	18	20	4	8
175a	42	--	30	4	—	3
176a	11	2	26	26	9	18
177a	2	--	--	--	--	--
178	67	2	3	9	—	3
179	3	8	12	18	4	6
180a	8	—	30	47	4	8
182	15	12	47	14	—	4
183	3	2	15	21	—	4
184	3	6	18	17	—	4
185b	3	--	9	14	6	14
186a	70	4	14	2	—	2
187	9	9	26	21	2	4
188	33	3	--	4	2	11

Sort D

Percentage of ETs placing items that describe their jobs into 5 categories of "How Often Done."

Item No.	All Rates Combined (66)	Very Seld.	Seldom	Occas.	Often	Very Often
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TABLE 187  
ELECTRONICS TECHNICIANS

Percentage of ETs (combined rates) placing items of Alpha and Beta subdecks in categories of Amount of Comprehension and Amount of Skill Required, using the categories of:(1)Very little(2)Some (3)Moderate (4)Much (5)Very much

Item No.	Comprehension(for each subdeck 31)					Skill(for each subdeck 31)				
	1	2	3	4	5	1	2	3	4	5
151a	--	--	48	39	13	6	13	55	26	--
152a*	3	32	62	--	3	6	58	29	6	6
153a*	--	--	39	55	6	--	26	52	16	--
155 *	10	43	47	3	--	10	48	39	3	6
156 *	--	13	35	47	6	--	19	48	26	6
157a	65	35	--	--	--	65	35	--	--	--
158a	19	48	29	--	3	10	65	23	6	--
159a*	16	48	32	3	--	6	71	16	--	--
160	45	45	10	--	--	26	55	19	--	--
161	29	55	10	6	--	42	58	--	--	--
162 *	10	32	29	26	3	10	23	45	19	3
163 *	39	29	19	13	--	32	58	6	3	6
164 *	--	10	52	29	10	--	13	43	39	--
166a	10	16	48	19	6	--	39	39	23	--
167a	10	32	32	23	3	--	29	45	13	6
168a	3	16	48	32	--	--	26	55	19	--
169 *	19	26	32	19	3	13	45	32	10	--
170	--	6	13	55	26	--	52	39	45	6
171	--	6	16	48	29	3	--	35	58	32
172	--	--	32	65	3	--	6	6	6	3
173	45	45	10	--	--	55	39	3	3	--
174 *	65	16	19	--	--	55	35	10	--	--
175a	23	52	26	--	--	26	52	19	3	13
176a	--	35	52	13	--	--	35	48	13	39
177a	3	32	32	26	6	--	26	32	39	--
178	35	35	26	3	--	19	68	13	--	3
179	--	16	19	55	10	3	13	52	6	1
180a*	10	43	43	6	--	3	62	29	--	19
182	32	39	23	3	3	32	65	3	3	--
183 *	6	3	19	29	43	--	10	10	35	19
184	6	19	23	42	10	--	13	52	19	6
185b*	29	55	10	6	--	--	62	26	3	--
186a	13	45	42	--	--	--	68	29	6	--
187	13	32	52	3	--	29	39	26	6	--
188 *	3	3	29	29	35	--	16	35	32	16

TABLE 188

SONARMEN

Sort A

Sort B

Frequency of SOs (by rate) selecting items that describe their job      Frequency & Percentage of SOs (by rate) selecting items that "best" describe job

Item No.	C (3)	1 (7)			2 (21)			3 (26)			Tot. (57)	C (3) f	1 (7) f			2 (21) f			Tot. (57) f	
		%	f	%	f	%	f	%	f	%			f	%	f	%	f	%		
151a	3	6	16	12							37	2	67	6	86	12	57	10	38	30 53
152a	3	4	13	11							31	1	33	4	57	8	38	7	27	20 35
153a	1	3	5	4							13	1	33	3	43	4	19	5	19	13 23
155	3	6	12	11							32	2	67	6	86	10	48	7	27	25 44
156	1	2	4	3							10	-	-	-	2	10	1	04	3 05	
157a	3	5	17	21							46	3	100	5	71	14	67	14	54	36 63
158a	3	6	17	10							36	1	33	6	86	13	62	8	31	28 49
159a	3	6	16	11							36	1	33	5	71	14	67	9	34	29 51
160	1	2	6	8							17	-	-	2	29	2	10	1	04	5 09
161	3	6	18	15							42	3	100	6	86	14	67	11	42	34 60
162	2	3	13	9							27	1	33	3	43	8	33	8	31	20 35
163	2	1	7	4							14	-	-	-	5	24	2	08	7 12	
164	-	-	--	2							2	-	-	-	-	-	-	-	--	
166a	-	1	7	7							15	-	-	1	14	7	33	5	19	13 23
167a	3	6	13	14							36	3	100	6	86	11	53	12	46	32 56
168a	-	3	8	9							20	-	-	2	29	5	24	5	19	12 21
169	-	3	7	4							14	-	-	3	43	4	19	3	12	10 18
170	-	3	5	5							13	-	-	1	14	2	10	4	15	7 12
171	-	2	5	3							10	-	-	1	14	2	10	3	12	6 11
172	1	2	4	5							12	-	-	2	29	3	14	2	08	7 12
173	3	5	14	16							38	3	100	5	71	10	48	11	42	29 51
174	3	6	15	15							39	2	67	6	86	12	57	9	35	29 51
175a	3	5	13	12							33	3	100	5	71	9	43	10	38	27 47
176a	-	2	8	4							14	-	-	1	14	1	05	1	04	3 05
177a	-	-	1	--							1	-	-	-	-	-	-	-	--	
178	3	6	18	12							39	2	67	6	86	14	67	11	42	33 58
179	-	-	1	--							1	-	-	-	1	05	-	-	1 02	
180a	2	4	11	2							19	-	-	2	29	2	10	1	04	5 09
182	3	5	14	10							32	3	100	5	71	13	62	8	31	29 51
183	3	6	12	7							28	3	100	6	86	8	38	6	23	23 40
184	3	6	12	6							27	3	100	6	86	11	52	4	15	24 42
185b	1	2	7	3							13	-	-	1	14	5	24	1	04	7 12
186a	2	5	13	11							31	2	67	5	71	10	48	8	31	25 44
187	3	6	14	15							38	3	100	6	86	10	48	11	42	30 53
188	-	3	10	5							18	-	-	2	02	3	14	1	04	6 11

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~~SECURITY INFORMATION~~

TABLE 189

SONARMEN

Sort C

Percentage of SOs placing items  
that describe their jobs into 4  
categories of "Where Learned."

Item All Rates Combined (57)  
No. Shore Formal Infor. Self-  
School Shipbd. Shipbd. Inst.

							All Rates Combined (57)				
							Very Seld.	Seldom	Occas.	Often	Very Often
151a	44	—	5	4	2	2	16	18	16	16	16
152a	28	—	4	4	5	4	12	12	12	2	2
153a	18	—	4	2	—	4	14	5	5	—	—
155	37	—	4	4	2	9	18	11	11	5	5
156	4	—	2	—	—	—	4	2	2	—	—
157a	51	—	5	7	—	7	16	25	25	16	4
158a	42	—	2	7	12	11	21	2	4	5	5
159a	42	2	2	5	7	11	25	—	—	—	—
160	5	—	2	2	2	2	2	14	14	7	7
161	47	—	9	4	4	12	23	—	—	—	—
162	14	—	9	12	2	12	12	2	2	7	7
163	2	2	4	5	7	4	2	—	—	—	—
164	—	—	—	—	—	—	—	—	—	—	—
166a	12	—	7	4	2	2	7	7	7	5	5
167a	35	—	12	9	5	12	9	12	12	18	18
168a	14	2	4	2	—	7	7	4	4	—	2
169	12	2	2	2	—	5	7	5	5	—	2
170	12	—	—	—	2	—	5	4	2	—	—
171	7	—	4	—	—	5	5	4	2	—	—
172	11	—	2	—	2	—	5	5	5	2	2
173	35	2	9	5	2	12	21	9	9	7	7
174	39	2	7	4	2	11	16	16	16	7	7
175a	26	4	14	4	—	5	12	12	12	12	18
176a	2	—	—	4	2	2	2	—	—	—	—
177a	—	—	—	—	—	—	—	—	—	—	—
178	53	—	—	—	5	2	12	14	12	18	2
179	—	—	—	—	2	—	—	4	—	—	—
180a	—	2	—	7	7	—	2	4	4	4	—
182	12	12	18	9	2	4	19	18	18	9	9
183	9	7	11	14	—	—	11	16	16	14	14
184	5	9	12	16	—	2	7	4	4	14	19
185b	2	—	7	4	4	—	5	—	—	—	—
186a	35	—	5	4	4	—	11	7	7	9	14
187	19	9	12	12	—	4	16	23	23	11	11
188	9	—	—	2	—	—	5	2	—	—	—

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SECURITY INFORMATION

TABLE 190

## RADARMEN

Sort A-Frequency of RDs selecting items that describe their job.  
Sort B-Frequency & Percentage of RDs selecting items that "best" describe job.  
Sort C-Percentage of RDs placing items that describe jobs into 4 categories  
of "Where Learned"(1)ShoreSchool(2)FormalShipbd.(3)Inf.Shipbd.(4)Self-Inst.  
Sort D-Percentage of RDs placing items that describe their jobs into 5 cate-  
gories of "How Often Done"(1)VerySeld.(2)Seldom(3)Occas.(4)Often(5)VeryOften

Item No.	Sort A All Rates Comb.(21)	Sort B All Rates Comb.(21)	Sort C				Sort D								
			All Rates	Comb.(21)	1	2	3	4	All Rates	Comb.(21)	1	2	3	4	5
151a	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
152a	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---
153a	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
155	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
156	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
157a	6	4 19	14	—	5	—	—	5	5	5 10	—	—	—	—	—
158a	2	1 05	5	—	—	—	—	—	—	5	—	—	—	—	—
159a	3	1 05	5	—	—	—	—	—	—	5	—	—	—	—	—
160	3	2 10	—	—	5	5	10	—	—	—	—	—	—	—	—
161	3	2 10	10	—	—	—	—	—	5	5	—	—	—	—	—
162	5	1 05	5	—	—	—	—	—	—	—	—	5	—	—	—
163	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
164	11	8 38	19	5	10	5	—	10	5	10	—	—	14	—	—
166a	8	5 24	—	—	24	—	—	5	10	10	—	—	—	—	—
167a	5	1 05	—	—	5	—	—	5	—	—	—	—	—	—	—
168a	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
169	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
170	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—
171	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
172	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
173	6	4 19	—	5	14	—	—	—	5	10	—	—	5	—	—
174	6	4 19	5	5	10	—	—	—	5	10	—	5	—	—	—
175a	6	3 14	5	5	5	—	—	5	—	5	—	5	—	—	—
176a	1	1 05	5	—	—	—	—	—	—	—	5	—	—	—	—
177a	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
178	3	2 10	10	—	—	—	—	—	5	—	—	—	5	—	—
179	16	16 76	19	24	19	14	—	—	—	19	43	14	—	—	—
180a	3	2 10	—	5	—	5	—	—	—	10	—	—	—	—	—
182	2	1 05	—	—	5	—	—	—	—	—	5	—	—	—	—
183	4	3 14	5	—	5	5	—	—	—	5	5	5	5	—	—
184	20	20 95	19	10	48	19	—	5	10	62	19	—	—	—	—
185b	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
186a	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—
187	3	2 10	5	—	5	—	—	—	5	5	—	—	—	—	—
188	2	2 10	5	—	—	5	—	5	—	—	5	—	—	—	—

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SECURITY INFORMATION

TABLE 191

## RADIOMEN

Sort A-Frequency of RMs selecting items that describe their job.  
Sort B-Frequency & Percentage of RMs selecting items that "best" describe job.  
Sort C-Percentage of RMs placing items that describe jobs into 4 categories  
of "Where Learned"(1) Shore School(2) Formal Shipbd.(3) Inf. Shipbd.(4) Self-Inst.  
Sort D-Percentage of RMs placing items that describe their jobs into 5 categories  
of "How Often Done"(1) Very Seld.(2) Seldom(3) Occas.(4) Often(5) Very Often

Item No.	Sort A		Sort B		Sort C				Sort D						
	All Rates	Comb.(20)	All Rates	Comb.(20)	All	Rates	Comb.(20)	1	2	3	4	1	2	3	4
151a	1	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
152a	1	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
153a	1	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
155	1	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
156	2	1 05	--	5	--	--	--	--	--	--	--	5	--	--	--
157a	8	5 25	--	--	15	10	10	10	5	10	--	--	--	--	--
158a	--	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
159a	--	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
160	1	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
161	8	2 10	--	--	5	5	5	5	5	5	--	--	--	--	--
162	--	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
163	1	1 05	--	--	5	--	--	5	--	--	--	--	--	--	--
164	--	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
166a	--	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
167a	--	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
168a	1	1 05	--	--	--	5	--	--	5	--	--	--	--	--	--
169	3	3 15	--	--	5	10	--	--	--	--	--	--	15	--	--
170	2	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
171	1	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
172	--	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
173	6	3 15	--	--	10	5	--	--	10	5	--	--	--	--	--
174	6	3 15	--	--	5	10	--	--	5	10	--	--	--	--	--
175a	7	4 20	--	--	15	5	--	--	5	15	--	--	--	--	--
176a	4	1 05	--	--	--	5	--	--	--	5	--	--	--	--	--
177a	--	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
178	1	1 05	--	--	--	--	5	--	--	--	5	--	--	--	--
179	--	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
180a	7	1 05	--	--	--	5	--	--	5	--	--	5	--	--	--
182	3	1 05	--	--	5	--	--	--	--	5	--	--	--	--	--
183	8	6 30	--	10	10	10	--	--	--	10	20	--	--	--	--
184	16	14 70	5	20	15	30	--	--	5	25	20	20	--	--	--
185b	--	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
186a	3	2 10	--	--	5	5	--	--	5	--	--	5	--	--	--
187	2	1 05	5	--	--	--	--	--	--	--	--	--	5	--	--
188	2	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--

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SECURITY INFORMATION

CARD SORT ITEMS

- 191 \*Determine receiver sensitivity.
- 192a Measure generator voltage output.
- 193 Replace brushes in motors.
- 195 \*Compute characteristic impedance of transmission line.
- 198 Compute impedance requirements in a given circuit.
  
- 199a\*Clean switch contact points.
- 201a\*Clean interior of equipment.
- 202 Measure inductance of a coil.
- 203 Measure tube current.
- 204 Measure current in resonant circuits.
  
- 205a\*Check for sufficiency of microphone current.
- 206 Charge battery.
- 207 Test battery for low cells.
- 209b\*Compute timing sequences in electronic circuits.
- 210 \*Measure ring time.
  
- 211 Use RF signal monitor to determine transmitter frequency.
- 212 Replace transformers.
- 213 Measure pulse width.
- 214 Check standing wave ratio.
- 215a\*Measure oscillator frequency in radio equipment using signal generator.
  
- 216a\*Check frequency spectrum of tank circuit.
- 216b\*Check frequency spectrum of magnetron.
- 217 Make monthly report of operation and performance of certain electronic gear.
- 218 \*Lubricate spur gears in IFF coordinator and indicator unit.
- 220 Meg antenna lines.
  
- 221 Correct instruction books when field change is made.
- 222 \*Keep file of stock tally cards.
- 223 \*Submit field change report card.
- 224 \*Visually inspect brushes in generators.
- 225 \*Visually inspect tubes for gas.
  
- 226 \*Visually inspect tubes for open filament.
- 228 Obtain information from operators on how gear broke down.
- 229a Check spare parts bins.
- 231 \*Adjust servo gain interlocks.
- 232a\*Use shorting bar.
- 233a Check the grounding of electronics equipment by using voltmeter.

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~~SECURITY INFORMATION~~

TABLE 192

ELECTRONICS TECHNICIANS

Sort A

Frequency of ETs (by rate) selecting items that describe their job

Item No.	0 (3)	1 (6)	2 (7)	3 (28)	SN (22)	Tot. (66)
----------	----------	----------	----------	-----------	------------	--------------

191	2	4	3	18	13	40
192a	3	5	4	18	17	47
193	3	5	3	20	13	44
195	-	1	1	1	1	4
198	-	2	1	7	5	15

199a	3	6	5	25	22	61
201a	2	6	5	26	22	61
202	1	2	1	2	2	8
203	3	6	4	17	14	44
204	1	1	1	9	7	19

205a	1	3	-	6	1	11
206	-	1	1	5	6	13
207	1	4	2	9	9	25
209b	-	3	-	4	4	11
210	3	6	5	23	18	55

211	1	4	4	10	11	30
212	3	5	5	23	16	52
213	1	3	2	8	3	17
214	2	3	2	9	6	22
215a	3	5	3	15	13	39

216a	-	2	-	5	3	10
216b	1	6	1	9	2	19
217	2	5	3	12	12	34
218	2	1	1	3	-	7
220	3	5	4	26	22	60

221	2	5	3	12	11	33
222	3	4	4	19	16	46
223	3	5	2	9	8	27
224	3	6	4	23	18	54
225	3	6	6	28	22	65

226	3	5	6	26	18	58
228	3	6	5	20	15	49
229a	2	4	5	21	22	54
231	1	-	1	1	2	5
232a	3	6	6	27	22	64
233a	2	2	5	13	13	34

Sort B

Frequency & Percentage of ETs (by rate) selecting items that "best" describe job

Item No.	0 (3)	1 (6)	2 (7)	3 (28)	SN (22)	Tot. (66)
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191	2	67	4	67	2	43	7	32	27	41		
192a	3	100	5	83	3	43	18	64	10	45	39	59
193	2	67	5	83	3	43	16	57	9	41	35	53
195	-	-	-	-	-	-	-	1	04	1	02	
198	-	-	1	17	-	5	18	1	04	7	11	

199a	3	100	6	100	5	71	26	93	14	64	54	82
201a	2	67	6	100	3	43	24	86	17	77	52	79
202	-	-	1	17	-	1	04	--	--	2	03	
203	1	33	5	83	4	57	14	50	10	45	34	52
204	1	33	1	17	1	14	6	21	5	23	14	21

205a	1	33	2	33	-	-	5	18	--	--	8	12
206	-	-	-	-	-	-	2	07	1	04	3	04
207	-	1	4	2	9	9	6	21	2	09	9	14
209b	-	3	-	4	4	-	1	04	2	09	6	09
210	3	100	6	100	6	86	23	82	15	68	53	80

211	1	33	3	50	3	43	8	28	4	18	19	29
212	3	100	4	67	5	71	22	78	14	64	48	73
213	1	33	2	33	-	-	6	21	1	04	10	15
214	2	67	3	50	2	29	6	21	2	09	15	23
215a	2	67	4	67	1	14	11	39	8	36	26	39

216a	-	-	1	17	-	-	1	04	--	--	2	03
216b	-	-	5	83	1	14	6	21	1	04	13	20
217	2	67	5	83	2	29	11	39	8	36	28	42
218	1	33	1	17	-	-	3	11	--	--	5	08
220	2	67	5	83	4	57	26	93	17	77	54	82

221	2	67	5	83	3	43	11	39	5	23	26	39
222	2	67	3	50	3	43	18	64	13	59	39	59
223	3	100	5	83	2	29	8	28	4	18	22	33
224	3	100	6	100	4	57	20	71	12	54	45	68
225	2	67	6	100	6	86	28	100	20	91	62	94

226	3	100	5	83	6	86	26	93	15	68	55	83
228	3	100	6	100	5	71	20	71	12	54	46	70
229a	2	67	4	67	3	43	16	57	14	64	39	59
231	1	-	1	1	2	-	-	-	-	-	-	-
232a	3	100	6	100	6	86	27	96	20	91	62	94
233a	1	33	2	33	4	57	14	50	7	32	28	42

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TABLE 193

ELECTRONICS TECHNICIANS

Sort C

Percentage of ETs placing items that describe their jobs into 4 categories of "Where Learned."

Item No.	All Rates Combined (66)			
	Shore School	Formal Shipbd.	Infor. Shipbd.	Self-Inst.

	191	192a	193	195	198	199a	201a	202	203	204	205a	206	207	209b	210	211	212	213	214	215a	216a	216b	217	218	220	221	222	223	224	225	226	228	229a	231	232a	233a
	20	26	21	2	9	27	21	2	39	17	--	2	8	6	36	21	24	24	4	23	2	4	4	11	21	2	2	50	54	8	--	80	24			
	6	2	--	--	--	29	4	2	3	2	--	--	2	2	32	8	27	2	4	2	11	4	4	11	11	11	11	11	11	11	11	11	11			
	8	15	15	--	--	24	27	4	4	3	3	2	2	2	11	11	21	3	4	3	3	4	17	17	6	3	3	3	3	3	3	3	3	3		
	8	17	17	--	--	24	27	4	4	3	3	2	2	2	11	11	21	3	4	3	3	4	17	17	6	3	3	3	3	3	3	3	3	3		
Very Seld.	3	8	8	2	2	3	--	4	6	3	3	2	2	2	3	3	2	4	4	3	3	4	17	17	6	3	3	3	3	3	3	3	3	3		
Seldom	9	14	15	--	3	17	3	2	6	3	2	2	2	2	14	4	14	3	4	3	3	4	17	17	6	3	3	3	3	3	3	3	3	3		
Occas.	21	29	26	--	6	30	35	2	17	6	3	3	2	2	14	4	32	2	4	3	3	4	17	17	6	3	3	3	3	3	3	3	3	3		
Often	8	8	4	--	--	30	32	--	17	11	3	3	2	2	41	4	2	2	2	2	2	17	17	6	3	3	3	3	3	3	3	3	3			
Very Often	--	.2	--	--	--	2	9	--	8	2	2	2	2	2	20	2	2	2	2	2	2	11	11	6	3	3	3	3	3	3	3	3	3			

Sort D

Percentage of ETs placing items that describe their jobs into 5 categories of "How Often Done."

	All Rates Combined (66)				
	Very Seld.	Seldom	Occas.	Often	Very Often

ELECTRONICS TECHNICIANS

Percentage of ETs (combined rates) placing items of Alpha and Beta subdecks in categories of Amount of Comprehension and Amount of Skill Required, using the categories of:(1)Very little (2)Some (3)Moderate (4)Much (5)Very much

Item No.	Comprehension(for each subdeck 31)					Skill(for each subdeck 31)					
	1	2	3	4	5	1	2	3	4	5	
191 *	--	--	35	55	10	--	13	6	52	35	6
192a	10	58	32	--	--	29	52	19	--	--	--
193	42	45	13	--	--	--	13	35	43	10	10
195 *	--	3	16	48	32	6	--	39	45	10	10
198	--	3	19	35	42	--	--	--	--	--	--
199a*	39	47	13	3	--	32	45	19	3	--	--
201a*	39	47	16	--	--	43	48	10	--	--	6
202	--	6	35	48	10	--	13	55	26	--	--
203	--	39	42	16	3	--	42	52	6	--	--
204	--	16	45	35	3	3	6	74	16	--	--
205a*	3	10	68	19	--	3	23	52	23	--	--
206	29	48	23	--	--	19	52	26	3	--	--
207	23	65	13	--	--	16	68	13	3	--	--
209b*	--	1	3	65	32	--	3	26	48	23	3
210 *	3	23	48	26	--	--	48	35	13	3	3
211	--	32	26	35	6	--	19	55	16	10	--
212	19	32	35	6	3	3	45	48	3	--	6
213	--	--	35	48	16	--	13	39	42	23	23
214	3	10	42	39	6	--	10	39	29	23	3
215a*	--	6	48	43	3	--	16	55	26	3	3
216a*	--	--	16	47	39	--	6	29	43	23	19
216b*	--	--	26	35	39	--	13	32	35	19	19
217	23	23	39	10	6	13	42	32	10	3	3
218 *	39	29	23	3	6	23	39	32	6	--	--
220	32	52	16	--	--	32	58	10	--	--	--
221	42	42	13	3	--	23	52	23	3	--	--
222 *	65	29	6	--	--	45	52	3	--	--	--
223 *	35	43	23	--	--	32	58	10	10	--	--
224 *	39	43	16	3	--	39	48	10	10	6	--
225 *	16	48	23	13	--	32	48	13	6	--	--
226 *	19	55	26	--	--	42	45	13	--	--	--
228			OMITTED						OMITTED		
229a	81	19	--	--	--	71	26	3	--	--	--
231 *	--	10	47	33	10	3	10	67	13	7	7
232a*	43	35	13	10	--	52	39	10	--	--	--
233a	10	48	35	6	--	13	35	52	--	--	--

TABLE 195

SONARMEN

Sort A

Sort B

Frequency of SOs (by rate) selecting items that describe their job

Frequency & Percentage of SOs (by rate) selecting items that "best" describe job

Item No.	C (3)	Tot.				C (3)	Tot.					
		1 (7)	2 (21)	3 (26)	(57)		1 (7)	2 (21)	3 (26)	(57)		
191	1	4	7	3	15	1	33	4	57	4	19	
192a	1	2	7	3	13	-	---	1	14	3	14	
193	1	4	8	5	18	-	---	3	43	4	19	
195	-	-	1	-	1	-	---	---	---	1	04	
198	-	-	1	4	5	-	---	---	---	2	08	
199a	3	6	13	15	37	2	67	6	86	9	43	
201a	1	6	18	25	50	1	33	6	86	17	81	
202	-	1	4	6	11	-	---	1	14	1	05	
203	2	4	10	8	24	1	33	3	43	6	29	
204	-	2	6	7	15	-	---	1	14	4	19	
205a	-	-	1	2	3	-	---	---	---	---	---	
206	-	-	--	--	--	-	---	---	---	---	---	
207	-	-	2	1	3	-	---	---	---	---	---	
209b	-	2	1	2	5	-	---	2	29	-	1	04
210	-	-	--	2	2	-	---	---	---	1	04	
211	-	-	1	1	2	-	---	---	---	---	---	
212	3	3	15	10	31	-	---	3	43	11	52	
213	-	1	1	4	6	-	---	1	14	1	05	
214	-	-	--	--	--	-	---	---	---	---	---	
215a	-	1	2	--	3	-	---	---	1	05	--	
216a	-	-	--	--	--	-	---	---	---	---	---	
216b	-	-	--	--	--	-	---	---	---	---	---	
217	3	7	14	12	36	3	100	7	100	10	48	
218	-	-	--	--	--	-	---	---	---	---	---	
220	-	-	--	--	--	-	---	---	---	---	---	
221	3	5	10	9	27	2	67	4	37	7	33	
222	-	-	5	1	6	-	---	-	---	2	10	
223	3	4	4	3	14	3	100	1	14	6	29	
224	2	5	9	7	23	1	33	4	57	6	29	
225	3	7	16	9	35	2	67	6	86	14	67	
226	3	7	16	17	43	3	100	6	86	14	67	
228	2	6	11	16	35	2	67	5	71	12	57	
229a	-	2	7	4	13	-	---	2	29	4	19	
231	-	-	1	1	2	-	---	---	---	1	04	
232a	3	7	16	14	40	3	100	6	86	16	77	
233a	1	3	10	10	24	-	---	2	29	8	38	

~~RESTRICTED~~  
~~SECURITY INFORMATION~~

TABLE 196

SONARMEN

Sort C

Percentage of SOs placing items that describe their jobs into 4 categories of "Where Learned."

Item No.	All Rates Combined (57)	Shore School	Formal Infor.	Self-School	Shipbd.	Shipbd. Inst.
----------	-------------------------	--------------	---------------	-------------	---------	---------------

Item No.	All Rates Combined (57)	Very Seld.	Seldom	Occas.	Often	Very Often
191	9	--	9	2	2	4
192a	9	--	--	4	4	5
193	7	--	4	4	5	2
195	--	--	--	--	--	--
198	4	--	--	--	2	--
199a	33	2	5	7	7	21
201a	28	19	21	12	--	11
202	7	--	--	2	5	4
203	23	--	5	--	5	14
204	12	--	2	--	2	7
205a	--	--	--	--	--	--
206	--	--	--	--	--	--
207	--	--	--	--	--	--
209b	4	2	--	--	--	2
210	--	--	2	--	2	--
211	--	--	--	--	--	--
212	23	2	4	5	7	4
213	5	--	5	--	4	9
214	--	--	--	--	--	2
215a	2	--	--	--	--	--
216a	--	--	--	--	--	--
216b	--	--	--	--	--	--
217	7	14	19	12	--	11
218	--	--	--	--	--	21
220	--	--	--	--	--	--
221	9	5	14	5	2	9
222	--	2	2	--	--	5
223	4	2	5	11	2	4
224	23	--	4	2	5	11
225	35	2	16	2	1	9
226	40	--	18	5	--	25
228	11	2	14	28	4	14
229a	2	2	7	4	--	9
231	--	--	2	--	2	--
232a	54	--	7	2	4	26
233a	25	--	4	2	2	7

Sort D

Percentage of SOs placing items that describe their jobs into 5 categories of "How Often Done."

Item No.	All Rates Combined (57)	Very Seld.	Seldom	Occas.	Often	Very Often
191	9	--	5	4	5	4
192a	9	--	4	4	--	--
193	7	--	5	2	--	--
195	--	--	--	--	--	--
198	4	--	--	--	--	--
199a	33	2	5	7	21	12
201a	28	19	21	12	11	32
202	7	--	2	--	4	--
203	23	--	5	--	14	5
204	12	--	2	--	7	4
205a	--	--	--	--	--	--
206	--	--	--	--	--	--
207	--	--	--	--	--	--
209b	4	2	--	--	2	--
210	--	--	2	--	--	--
211	--	--	--	--	--	--
212	23	2	4	5	12	9
213	5	--	5	--	5	2
214	--	--	--	--	--	--
215a	2	--	--	--	--	2
216a	--	--	--	--	--	--
216b	--	--	--	--	--	--
217	7	14	19	12	--	11
218	--	--	--	--	--	21
220	--	--	--	--	--	--
221	9	5	14	5	2	9
222	--	2	2	--	--	5
223	4	2	5	11	2	4
224	23	--	4	2	5	11
225	35	2	16	2	1	9
226	40	--	18	5	--	25
228	11	2	14	28	4	14
229a	2	2	7	4	--	9
231	--	--	2	--	2	--
232a	54	--	7	2	4	26
233a	25	--	4	2	2	7

~~RESTRICTED~~

TABLE 197

## RADARMEN

Sort A-Frequency of RDs selecting items that describe their job.  
Sort B-Frequency & Percentage of RDs selecting items that "best" describe job.  
Sort C-Percentage of RDs placing items that describe jobs into 4 categories  
of "Where Learned"(1)ShoreSchool(2)FormalShipbd.(3)Inf.Shipbd.(4)Self-Inst.  
Sort D-Percentage of RDs placing items that describe their jobs into 5 cate-  
gories of "How Often Done"(1)VerySeld.(2)Seldom(3)Occas.(4)Often(5)Very Often

Item No.	Sort A All Rates Comb.(21)	Sort B All Rates Comb.(21)	Sort C				Sort D				
			All Rates 1	All Rates 2	Comb.(21) 3	4	All Rates 1	All Rates 2	Comb.(21) 3	4	5
191	3	1 05	--	--	--	5	5	5	--	--	--
192a	1	-- --	--	--	--	--	--	--	--	--	--
193	3	1 05	5	--	--	--	--	5	--	--	--
195	--	-- --	--	--	--	--	--	--	--	--	--
198	1	1 05	5	--	--	--	--	5	--	--	--
199a	6	4 19	19	--	--	--	10	--	10	--	--
201a	18	16 76	24	10	38	5	10	--	10	43	14
202	1	-- --	--	--	--	--	--	--	--	--	--
203	4	1 05	--	--	5	--	--	--	5	--	--
204	2	-- --	--	--	--	--	--	--	--	--	--
205a	1	-- --	--	--	--	--	--	--	--	--	--
206	2	-- --	--	--	--	--	--	--	--	--	--
207	1	-- --	--	--	--	--	--	--	--	--	--
209b	--	-- --	--	--	--	--	--	--	--	--	--
210	10	8 38	14	14	10	--	5	--	14	10	10
211	--	-- --	--	--	--	--	--	--	--	--	--
212	1	-- --	--	--	--	--	--	--	--	--	--
213	8	7 33	29	--	--	5	5	5	14	10	--
214	1	-- --	--	--	--	--	--	--	--	--	--
215a	1	-- --	--	--	--	--	--	--	--	--	--
216a	--	-- --	--	--	--	--	--	--	--	--	--
216b	1	-- --	--	--	--	--	--	--	--	--	--
217	7	5 24	--	5	19	--	--	--	5	14	5
218	3	1 05	--	5	--	--	5	--	--	--	--
220	1	-- --	--	--	--	--	--	--	--	--	--
221	2	2 10	5	--	5	--	--	5	5	--	--
222	5	5 24	--	--	19	5	10	--	5	5	5
223	--	-- --	--	--	--	--	--	--	--	--	--
224	3	-- --	--	--	--	--	--	--	--	--	--
225	7	5 24	10	--	14	--	--	10	10	5	--
226	6	5 24	14	--	10	--	5	--	5	10	5
228	10	11 52	14	10	10	19	--	14	10	14	14
229a	2	-- --	--	--	--	--	--	--	--	--	--
231	--	-- --	--	--	--	--	--	--	--	--	--
232a	11	10 48	33	10	5	--	5	10	19	10	5
233a	2	1 05	5	--	--	--	5	--	--	--	--

RESTRICTED  
SECURITY INFORMATION

TABLE 198

## RADIOMEN

Sort A-Frequency of RMs selecting items that describe their job.  
Sort B-Frequency & Percentage of RMs selecting items that "best" describe job.  
Sort C-Percentage of RMs placing items that describe jobs into 4 categories  
of "Where Learned"(1)ShoreSchool(2)FormalShipbd.(3)Inf.Shipbd.(4)Self-Inst.  
Sort D-Percentage of RMs placing items that describe their jobs into 5 cate-  
gories of "How Often Done"(1)VerySeld.(2)Seldom(3)Occas.(4)Often(5)VeryOften

Item No.	Sort A All Rates Comb.(20)	Sort B All Rates Comb.(20)	Sort C				Sort D						
			All Rates	Comb.(20)	1	2	3	4	All Rates	Comb.(20)	1	2	3
191	5	2 10	—	—	5	5	—	—	5	—	5	—	—
192a	1	— —	—	—	—	—	—	—	—	—	—	—	—
193	2	— —	—	—	—	—	—	—	—	—	—	—	—
195	1	1 05	—	5	—	—	—	—	—	—	5	—	—
198	1	1 05	5	—	—	—	—	—	—	5	—	—	—
199a	7	4 20	—	—	15	5	5	—	—	15	—	—	—
201a	15	16 80	5	15	35	25	—	—	5	25	50	—	—
202	—	— —	—	—	—	—	—	—	—	—	—	—	—
203	2	1 05	—	—	5	—	5	—	—	—	—	—	—
204	—	— —	—	—	—	—	—	—	—	—	—	—	—
205a	1	1 05	—	5	—	—	—	—	—	—	—	—	5
206	2	— —	—	—	—	—	—	—	—	—	—	—	—
207	2	— —	—	—	—	—	—	—	—	—	—	—	—
209b	—	— —	—	—	—	—	—	—	—	—	—	—	—
210	—	— —	—	—	—	—	—	—	—	—	—	—	—
211	3	3 15	—	5	5	5	—	—	5	—	10	—	—
212	1	— —	—	—	—	—	—	—	—	—	—	—	—
213	—	— —	—	—	—	—	—	—	—	—	—	—	—
214	—	— —	—	—	—	—	—	—	—	—	—	—	—
215a	1	— —	—	—	—	—	—	—	—	—	—	—	—
216a	—	— —	—	—	—	—	—	—	—	—	—	—	—
216b	—	— —	—	—	—	—	—	—	—	—	—	—	—
217	8	4 20	—	10	10	—	—	—	5	5	5	5	—
218	—	— —	—	—	—	—	—	—	—	—	—	—	—
220	5	1 05	—	—	5	—	—	—	5	—	—	—	—
221	3	2 10	—	5	5	—	—	5	—	—	—	—	5
222	—	— —	—	—	—	—	—	—	—	—	—	—	—
223	—	— —	—	—	—	—	—	—	—	—	—	—	—
224	4	2 10	—	—	5	5	—	—	5	—	—	—	—
225	4	1 05	—	—	—	5	—	—	—	—	—	—	5
226	3	3 15	—	—	10	5	—	—	5	—	5	—	5
228	10	8 40	5	10	10	15	—	—	—	30	10	—	—
229a	2	— —	—	—	—	—	—	—	—	—	—	—	—
231	—	— —	—	—	—	—	—	—	—	—	—	—	—
232a	9	7 35	—	5	20	10	—	—	15	15	5	—	—
233a	—	— —	—	—	—	—	—	—	—	—	—	—	—

RESTRICTED

CARD SORT ITEMS

- 235 \*Replace variacs.
- 236a\*Calibrate sonar range unit according to a known depth.
- 237a\*Determine front to back ratio of crystals.
- 238 \*Replace crystal detectors or rectifiers.
- 239a Replace or repair mechanical keying relays.
  
- 240 Synchronize PPI sweeps in corrective maintenance.
- 241 \*Vary tank circuit capacitance by installing another fixed capacitor.
- 242a Measure selectivity (band pass) of sonar receiver.
- 243 \*Clean exterior of electronics gear.
- 255 \*Repair range indicator recorders.
  
- 256 \*Tune and adjust fathometer.
- 257 \*Adjust attack plotter.
- 258 \*Check sonar bearings against optical bearings to determine bearing accuracy.
- 259 Repair or adjust train light switches.
- 260 Repair or remove a sonar transducer.
  
- 261 Check resistance of magnetostriction transducer.
- 262 \*Seat a retractable sonar dome.
- 263 Check sea chest for leakage.
- 264 \*Adjust sound head.
- 265 Repair hoist-lower systems on sound heads.
  
- 266 Repair cavitation indicator.
- 267 Check sonar buoys.
- 268 Change paper roll in sonar indicator-recorder.
- 269 Change indicating light in sonar range indicator.
- 271 \*Repair lubricating system pumps.
  
- 272 \*Take inventory of all spare parts.
- 273 \*Take inventory of all portable testing equipment.
- 274 \*Take inventory of ordinary hand tools.
- 275a\*Repair modulation and keying circuit in microphone.
- 276a\*Measure Q of a coil with a portable Q-meter.
  
- 277a Check continuity of transmission lines with ohmmeter.
- 278 Measure transformer resistance.
- 280 \*Replace tuning capacitor in three band RF coil.
- 281 Repair diaphragm of velocity (ribbon) microphone.
- 282 Check for current loop with neon glow tube or voltmeter.
- 284 Compute resonant frequencies in filter.

ELECTRONICS TECHNICIANS

Sort A

Sort B

Frequency of ETs (by rate) selecting items that describe their job      Frequency & Percentage of ETs (by rate) selecting items that "best" describe job

Item No.	C (3)	1 (6)	2 (7)	3 (28)	SN (22)	Tot. (66)	C (3)	1 (6)	2 (7)	3 (28)	SN (22)	Tot. (66)						
235	3	3	3	13	13	35	-	3	50	3	43	12	43	6	27	24	36	
236a	-	-	-	--	--	--	-	-	-	-	-	-	-	-	-	--	--	
237a	3	5	4	15	11	38	3	100	5	83	3	43	13	46	10	45	34	52
238	3	6	3	21	14	47	3	100	6	100	3	43	21	75	12	54	45	68
239a	3	5	3	17	13	41	1	33	3	50	2	29	14	50	6	27	26	39
240	2	5	4	10	5	26	2	67	5	83	4	57	9	32	4	18	24	36
241	-	3	1	6	--	10	-	-	1	17	-	-	2	07	--	--	3	04
242a	-	2	4	4	--	6	-	-	1	17	-	-	1	04	--	--	2	03
243	2	6	3	21	18	50	2	67	6	100	3	43	15	54	10	45	36	54
255	-	4	2	9	3	18	-	-	1	17	-	-	6	21	1	04	8	12
256	-	5	-	10	4	19	-	-	2	33	-	-	6	21	2	09	10	15
257	-	1	-	6	1	8	-	-	1	17	-	-	6	21	--	--	7	11
258	-	3	-	3	--	6	-	-	-	-	-	-	2	07	--	--	2	03
259	-	2	-	4	2	8	-	-	1	17	-	-	2	07	1	04	4	06
260	-	-	-	--	--	--	-	-	-	-	-	-	--	--	--	--	--	--
261	-	4	-	3	--	7	-	-	-	-	-	-	1	04	--	--	1	02
262	-	1	-	5	1	7	-	-	1	17	-	-	1	04	--	--	2	03
263	-	2	-	2	1	5	-	-	-	-	-	-	2	07	--	--	2	03
264	-	-	-	--	--	--	-	-	-	-	-	-	--	--	--	--	--	--
265	-	1	-	3	1	5	-	-	-	-	-	-	1	04	--	--	1	02
266	-	-	-	1	--	1	-	-	-	-	-	-	--	--	--	--	--	--
267	-	1	1	2	--	4	-	-	-	-	-	-	--	--	--	--	--	--
268	-	4	-	5	--	9	-	-	-	-	-	-	1	04	1	04	2	03
269	-	3	-	6	--	9	-	-	1	17	-	-	4	14	--	--	5	08
271	-	1	1	-	1	3	-	-	1	17	-	-	--	--	--	--	1	02
272	3	6	3	18	16	46	1	33	5	83	2	29	14	50	10	45	32	48
273	3	6	3	16	16	44	2	67	6	100	1	14	13	46	7	32	29	44
274	3	6	2	18	11	40	2	67	6	100	1	14	13	46	5	23	27	41
275a	3	5	3	19	12	42	3	100	5	83	1	14	19	68	8	36	36	54
276a	-	-	-	--	--	--	-	-	-	-	-	-	--	--	--	--	--	--
277a	3	5	4	19	18	49	2	67	3	50	4	57	16	57	11	50	36	54
278	3	6	5	23	15	52	2	67	5	83	5	71	23	82	11	50	46	70
280	1	1	2	4	2	10	1	33	-	-	-	-	2	07	--	--	3	04
281	-	1	1	1	--	3	-	-	-	-	-	-	--	--	--	--	--	--
282	1	1	4	10	10	26	-	-	1	17	3	43	9	32	5	23	18	27
294	1	1	-	5	3	10	-	-	-	-	-	-	2	09	2	03	--	--

TABLE 200

## ELECTRONICS TECHNICIANS

## Sort C

Percentage of ETs placing items that describe their jobs into 4 categories of "Where Learned."

Item No.	All Rates Combined (66)	Shore School	Formal Shipbd.	Infor. Inst.	Self-Sel'd.
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Item No.	All Rates Combined (66)	Very Seld.	Seldom Seld.	Occas.	Often	Very Often
235	12	--	14	11	6	12
236a	--	--	--	--	--	--
237a	15	3	27	6	3	11
238	27	--	26	15	8	15
239a	4	--	18	17	3	15
240	3	--	20	14	3	11
241	--	2	--	3	--	--
242a	--	2	--	2	--	--
243	18	2	17	18	4	4
255	4	1	4	3	--	--
256	2	--	11	3	--	4
257	3	--	3	4	--	8
258	--	--	3	--	--	2
259	--	--	2	--	2	3
260	--	--	--	--	--	2
261	--	--	--	2	--	2
262	--	2	--	2	2	1
263	--	--	3	--	1	2
264	--	--	2	--	1	1
265	--	--	2	--	1	1
266	--	--	--	--	--	--
267	--	--	--	--	--	--
268	2	--	--	--	--	2
269	2	--	--	--	--	1
271	--	--	--	--	--	--
272	--	3	18	27	8	8
273	2	3	14	26	3	23
274	--	3	6	32	4	9
275a	2	3	18	32	6	12
276a	--	--	--	--	--	20
277a	24	3	18	9	3	18
278	52	--	6	12	4	18
280	2	--	--	3	11	--
281	--	--	--	--	--	--
282	9	--	15	3	2	9
294	3	--	--	--	--	2

## Sort D

Percentage of ETs placing items that describe their jobs into 5 categories of "How Often Done."

ELECTRONICS TECHNICIANS

Percentage of ETs (combined rates) placing items of Alpha and Beta subdecks in categories of Amount of Comprehension and Amount of Skill Required, using the categories of:(1)Very little (2)Some (3)Moderate (4)Much (5)Very much

Item No.	Comprehension(for each subdeck 31)					Skill(for each subdeck 31)				
	1	2	3	4	5	1	2	3	4	5
235 *	10	47	32	13	—	10	35	52	3	—
236a*	7	7	37	48	—	—	10	43	40	7
237a*	6	23	52	10	10	6	29	42	19	3
238 *	10	32	52	6	—	10	—	52	6	—
239a	6	35	48	10	—	6	23	42	23	6
240	—	6	71	16	6	—	3	52	39	6
241 *	—	16	32	35	16	—	10	55	32	3
242a	—	3	39	45	13	—	6	48	32	13
243 *	90	10	—	—	—	94	6	—	—	—
255 *	—	3	20	67	10	—	3	27	57	13
256 *	—	3	55	39	3	3	3	58	35	—
257 *	—	3	40	50	6	—	10	47	33	10
258 *	29	23	32	16	—	3	29	48	19	—
259	7	37	43	17	—	10	29	39	16	6
260	3	23	23	37	13	—	13	19	35	32
261	—	27	30	37	7	3	16	55	26	—
262 *	37	20	23	13	6	7	17	40	27	10
263	70	20	7	3	—	48	42	6	3	—
264 *	3	13	23	50	10	—	7	37	47	10
265	17	17	43	17	7	3	13	42	39	3
266	—	—	28	59	14	—	—	33	53	13
267	24	17	34	21	3	13	30	37	20	—
268	65	29	6	—	—	52	39	6	3	—
269	87	6	3	—	—	87	6	6	—	—
271 *	39	39	10	6	6	6	32	35	26	—
272 *	68	16	10	6	—	45	52	3	—	—
273 *	77	13	10	—	—	77	23	—	—	—
274 *	90	3	6	—	—	84	16	—	—	—
275a*	6	23	47	19	6	—	32	45	23	—
276a*	—	16	43	32	10	—	29	55	10	6
277a	37	39	26	—	—	19	48	32	—	—
278	19	42	35	3	—	3	55	35	3	3
280 *	6	32	39	16	6	3	26	52	19	—
281	3	39	39	16	3	3	13	32	42	10
282	3	26	58	13	—	6	32	52	10	—
294	OMITTED					OMITTED				

RESTRICTED  
SECURITY INFORMATION

TABLE 202

SONARMEN

Sort A

Frequency of SOs (by rate) selecting items that describe their job

Item No.	C (3)	1 (7)	2 (21)	3 (26)	Tot. (57)
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235	-	1	--	2	3	-	1	14	--	2	08	3	05		
236a	1	2	8	7	18	1	33	--	7	33	4	15	12	21	
237a	-	-	--	--	--	-	-	-	-	-	-	-	--	--	
238	-	-	2	--	2	-	-	-	2	10	-	-	2	04	
239a	2	5	11	9	27	2	67	4	57	9	43	6	23	21	37
240	-	-	5	3	8	-	-	-	5	24	3	12	8	14	
241	-	-	2	1	3	-	-	-	1	05	-	-	1	02	
242a	1	3	6	7	17	1	33	3	43	3	14	2	08	9	16
243	1	7	20	25	53	1	33	7	100	19	91	24	92	51	89
255	3	5	12	13	33	3	100	4	57	8	38	8	31	23	40
256	1	7	16	17	41	1	33	7	100	15	71	15	58	38	67
257	3	7	16	17	43	3	100	7	100	15	71	18	69	43	75
258	3	6	18	20	47	2	67	6	86	17	81	19	73	44	77
259	-	2	6	1	9	-	-	2	29	1	05	1	04	4	07
260	-	-	2	2	4	-	-	-	-	-	-	-	-	--	--
261	2	4	10	5	21	2	67	4	57	9	43	3	12	18	32
262	-	1	8	11	20	-	-	1	14	6	29	9	34	16	28
263	2	7	16	17	42	2	67	7	100	16	77	15	58	40	70
264	-	1	3	3	7	-	-	-	-	2	10	-	-	2	04
265	1	5	4	5	15	1	33	4	57	3	14	-	-	8	14
266	-	-	--	--	--	-	-	-	-	-	-	-	-	--	--
267	-	1	8	3	12	-	-	1	14	4	19	4	15	9	16
268	2	4	17	22	45	2	67	4	57	17	81	22	85	45	79
269	2	3	12	13	30	2	67	3	43	10	48	7	27	22	39
271	-	-	--	--	--	-	-	-	-	-	-	-	-	--	--
272	-	2	11	5	18	-	-	2	29	5	24	2	08	9	16
273	1	2	5	3	11	1	33	2	29	4	19	-	-	7	12
274	2	6	14	4	26	1	33	4	57	11	52	1	04	17	30
275a	-	-	--	--	--	-	-	-	-	-	-	-	-	--	--
276a	-	-	--	--	--	-	-	-	-	-	-	-	-	--	--
277a	1	4	10	9	24	1	33	4	57	6	29	4	15	15	26
278	2	5	14	9	30	1	33	6	86	10	48	5	19	22	39
280	-	-	--	--	--	-	-	-	-	-	-	-	-	--	--
281	-	-	--	--	--	-	-	-	-	-	-	-	-	--	--
282	-	-	--	--	--	-	-	-	-	-	-	-	-	--	--
294	-	1	2	2	5	-	-	-	-	-	-	1	04	1	02

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TABLE 203

SONARMEN

Sort C

Percentage of SOs placing items  
that describe their jobs into 4  
categories of "Where Learned."

Item All Rates Combined (57)  
No. Shore Formal Infor. Self-  
School Shipbd. Shipbd. Inst.

	Very	Seld.	All Rates Combined (57)	Seldom	Occas.	Often	Very	Often
235	5	--	--	2	4	--	--	--
236a	11	2	4	5	4	7	5	5
237a	--	--	--	--	--	--	--	--
238	4	--	--	--	--	2	--	2
239a	19	--	11	7	5	14	12	4
240	11	--	2	2	--	5	4	5
241	2	--	--	--	2	--	--	--
242a	12	--	2	2	4	7	4	2
243	21	11	39	19	4	--	33	54
255	33	--	4	2	2	12	16	4
256	39	2	12	14	2	5	18	19
257	63	--	2	11	2	7	14	25
258	25	11	28	14	2	11	14	26
259	5	2	--	--	--	4	2	2
260	--	--	--	--	--	--	--	--
261	19	2	9	2	9	5	9	9
262	5	7	12	4	4	5	2	12
263	18	9	35	9	5	5	18	19
264	2	--	--	2	--	4	--	--
265	7	2	5	--	9	2	4	--
266	--	--	--	--	--	--	--	--
267	7	2	4	4	5	5	2	2
268	68	4	4	4	4	2	14	28
269	23	5	7	4	4	7	21	5
271	--	--	--	--	--	--	--	--
272	4	--	11	2	--	9	7	--
273	4	4	4	2	2	4	4	4
274	5	4	4	18	--	11	12	2
275a	--	--	--	--	--	--	--	--
276a	--	--	--	--	--	--	--	--
277a	16	--	5	5	2	5	12	5
278	33	--	2	4	4	5	21	4
280	--	--	--	--	--	--	--	--
281	--	--	--	--	--	--	--	--
282	--	--	--	--	--	--	--	--
294	2	--	--	--	--	2	--	--

Sort D

Percentage of SOs placing items that  
describe their jobs into 5 categories  
of "How Often Done."

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~~SECURITY INFORMATION~~

TABLE 204

## RADARMEN

Sort A-Frequency of RDs selecting items that describe their job.  
Sort B-Frequency & Percentage of RDs selecting items that "best" describe job.  
Sort C-Percentage of RDs placing items that describe jobs into 4 categories  
of "Where Learned"(1)ShoreSchool(2)FormalShipbd.(3)Inf.Shipbd.(4)Self-Inst.  
Sort D-Percentage of RDs placing items that describe their jobs into 5 cate-  
gories of "How Often Done"(1)VerySeld.(2)Seldom(3)Occas.(4)Often(5)VeryOften

Item No.	Sort A	Sort B	Sort C				Sort D								
	All Rates Comb.(21)	All Rates Comb.(21)	All Rates	Comb.(21)	1	2	3	4	All Rates	Comb.(21)	1	2	3	4	5
235	--	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
236a	--	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
237a	1	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
238	2	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
239a	1	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
240	2	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
241	--	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
242a	--	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
243	18	16 76	19	10	38	10	10	10	—	5	43	19			
255	--	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
256	4	3 14	--	--	10	5	--	5	5	5	5				
257	--	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
258	1	1 05	--	--	5	--	--	5	--	--	--	--	--	--	--
259	--	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
260	--	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
261	--	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
262	--	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
263	--	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
264	--	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
265	--	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
266	--	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
267	1	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
268	1	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
269	1	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
271	--	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
272	1	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
273	1	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
274	4	3 14	5	--	10	--	--	5	--	--	10	--	--	--	--
275a	--	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
276a	--	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
277a	--	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
278	--	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
280	--	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
281	--	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
282	--	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--
294	--	-- --	--	--	--	--	--	--	--	--	--	--	--	--	--

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SECURITY INFORMATION

TABLE 205

RADIOMEN

Sort A-Frequency of RMs selecting items that describe their job.  
Sort B-Frequency & Percentage of RMs selecting items that "best" describe job.  
Sort C-Percentage of RMs placing items that describe jobs into 4 categories  
of "Where Learned"(1)ShoreSchool(2)FormalShipbd.(3)Inf.Shipbd.(4)Self-Inst.  
Sort D-Percentage of RMs placing items that describe their jobs into 5 categories  
of "How Often Done"(1)VerySeld.(2)Seldom(3)Occas.(4)Often(5)VeryOften

Item No.	Sort A All Rates Comb.(20)	Sort B All Rates Comb.(20)	Sort C				Sort D						
			All Rates	Comb.(20)	1	2	3	4	All Rates	Comb.(20)	1	2	3
235	--	-- --	--	--	--	--	--	--	--	--	--	--	--
236a	--	-- --	--	--	--	--	--	--	--	--	--	--	--
237a	--	-- --	--	--	--	--	--	--	--	--	--	--	--
238	--	-- --	--	--	--	--	--	--	--	--	--	--	--
239a	2	-- --	--	--	--	--	--	--	--	--	--	--	--
240	--	-- --	--	--	--	--	--	--	--	--	--	--	--
241	--	-- --	--	--	--	--	--	--	--	--	--	--	--
242a	--	-- --	--	--	--	--	--	--	--	--	--	--	--
243	19	16 80	--	20	35	25	--	5	20	45	10	--	--
255	--	-- --	--	--	--	--	--	--	--	--	--	--	--
256	--	-- --	--	--	--	--	--	--	--	--	--	--	--
257	--	-- --	--	--	--	--	--	--	--	--	--	--	--
258	--	-- --	--	--	--	--	--	--	--	--	--	--	--
259	--	-- --	--	--	--	--	--	--	--	--	--	--	--
260	--	-- --	--	--	--	--	--	--	--	--	--	--	--
261	--	-- --	--	--	--	--	--	--	--	--	--	--	--
262	--	-- --	--	--	--	--	--	--	--	--	--	--	--
263	--	-- --	--	--	--	--	--	--	--	--	--	--	--
264	--	-- --	--	--	--	--	--	--	--	--	--	--	--
265	--	-- --	--	--	--	--	--	--	--	--	--	--	--
266	--	-- --	--	--	--	--	--	--	--	--	--	--	--
267	--	-- --	--	--	--	--	--	--	--	--	--	--	--
268	--	-- --	--	--	--	--	--	--	--	--	--	--	--
269	--	-- --	--	--	--	--	--	--	--	--	--	--	--
271	--	-- --	--	--	--	--	--	--	--	--	--	--	--
272	1	1 05	--	--	5	--	--	5	--	--	--	--	--
273	--	-- --	--	--	--	--	--	--	--	--	--	--	--
274	3	2 10	--	--	5	5	5	5	5	--	--	--	--
275a	2	1 05	--	--	--	5	--	--	--	5	--	--	--
276a	--	-- --	--	--	--	--	--	--	--	--	--	--	--
277a	1	-- --	--	--	--	--	--	--	--	--	--	--	--
278	2	-- --	--	--	--	--	--	--	--	--	--	--	--
280	--	-- --	--	--	--	--	--	--	--	--	--	--	--
281	--	-- --	--	--	--	--	--	--	--	--	--	--	--
282	2	2 10	--	--	5	5	--	--	5	--	5	--	--
294	--	-- --	--	--	--	--	--	--	--	--	--	--	--

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